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the WAVE
Nantucket Regional Transit Authority

NRTA Year-Round Bus Service Study

Final Report

Nantucket Regional Transit Authority

April 2016

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NRTA Year-Round Bus Service Study – Executive Summary

Public Outreach

NRTA used a multifaceted approach to gather public input on the need for and interest in year-round bus service. The outreach effort included a series of interactive public workshops, pop-up tables, stakeholder meetings and an online survey. A mailer was sent to every registered business and residential address on Nantucket (10,749) using Every Door Direct Mail with information about the upcoming events and a link to the survey. Approximately 50 people participated in the interactive workshops and another 80 at the pop-up tables. At the stakeholder meeting, over a dozen different groups participated, representing local businesses, community groups, schools, human service organizations and religious groups. The participants discussed the potential for year-round service and what it would mean to their employees/patrons/members. It was a huge success!

1,132 surveys were completed

Survey Highlights

- 32% of respondents do not have a private car to get around during the winter.
- 47% of respondents who don't currently use the WAVE would if year-round service was provided
- 79% use the WAVE during the summer
- 96% of those who use the WAVE during the summer would use the service in the winter
- 68% of current WAVE riders take the bus at least once a week
- If winter service was available, 22.9% would use the WAVE 5+ days a week

Study Description

The purpose of the Nantucket Year-Round Transit Study is to evaluate the feasibility of providing year-round fixed route service and to develop recommendations. Currently fixed route transit service is provided mid-May through early October. The recently completed Regional Transit Plan acknowledged the possible need for year-round bus service to serve a growing year-round population. In just four years the island population has grown by 6.7%.

Existing Conditions

Operations

In order to evaluate each existing route, data on ridership, revenue hours, revenue miles, operating cost, and farebox revenue were collected. NRTA routes perform better than the state average for all Massachusetts Regional Transit Authorities (RTA) for many of the route-level performance indicators used to evaluate transit services as indicated in green below. As a whole the system outperforms rural transit providers nationwide and within New England.

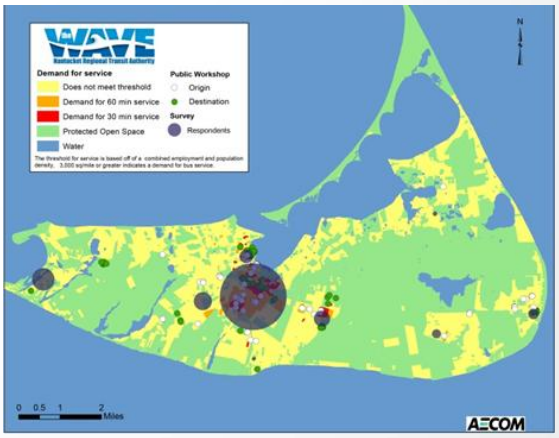
Route Name	Farebox Recovery	Passengers per Mile	Passengers per Hour	Cost per Mile	Cost per Passenger	Subsidy/ passenger
Airport Route	11.2%	0.75	3.78	$13.51	$18.11	$16.08
Jetties Beach	34.2%	6.62	23.83	$19.00	$2.87	$1.89
Madaket Route	35.3%	1.07	13.57	$5.41	$5.04	$3.26
Miacomet Loop	27.5%	1.57	17.05	$6.31	$4.01	$2.91
Mid Island Loop	26.1%	2.03	15.76	$8.80	$4.34	$3.21
Sconset via Milestone Rd	48.6%	1.32	18.56	$4.85	$3.69	$1.90
Sconset via Old South Rd	57.8%	1.46	23.08	$4.33	$2.96	$1.25
Sconset via Polpis Rd	31.6%	0.77	11.53	$4.56	$5.93	$4.06
Surfside Beach	68.8%	2.50	25.85	$6.61	$2.65	$0.82
Fixed Route System Total	32.6%*	1.54	15.90	$8.05	$5.22	$3.81
Ferry Connector	90.5%**	0.97	2.33	$28.60	$29.42	$2.79

NRTA has seen a surge in ridership, with a 9.9% increase between 2012 and 2015. While ridership is higher during the summer months, during the shoulder seasons the average daily ridership is two times higher than the daily system ridership of two other RTAs that have year-round service. With low subsidy cost per passenger and high farebox recovery ratios, NRTA is a financially efficient system.

NRTA is a rural system performing like an urban system—primarily due to the space constraints on the island leading to denser than traditional rural residential and commercial development—as well as the dramatic influx of tourists swelling the Island's population in the summer months.

Market

The year-round Island population is concentrated in the downtown and mid-island regions, although there are some pockets of higher-density residential areas in Tom Nevers, Sconset and Madaket. An analysis of socio-economic conditions showed that mid-island and downtown have the highest demand for service and could support 30-60 minute bus service in the off-season. The ridership demand projections estimated solid ridership in the off-season, indicating there is a latent demand for year-round bus service on the Island.



Recommendations

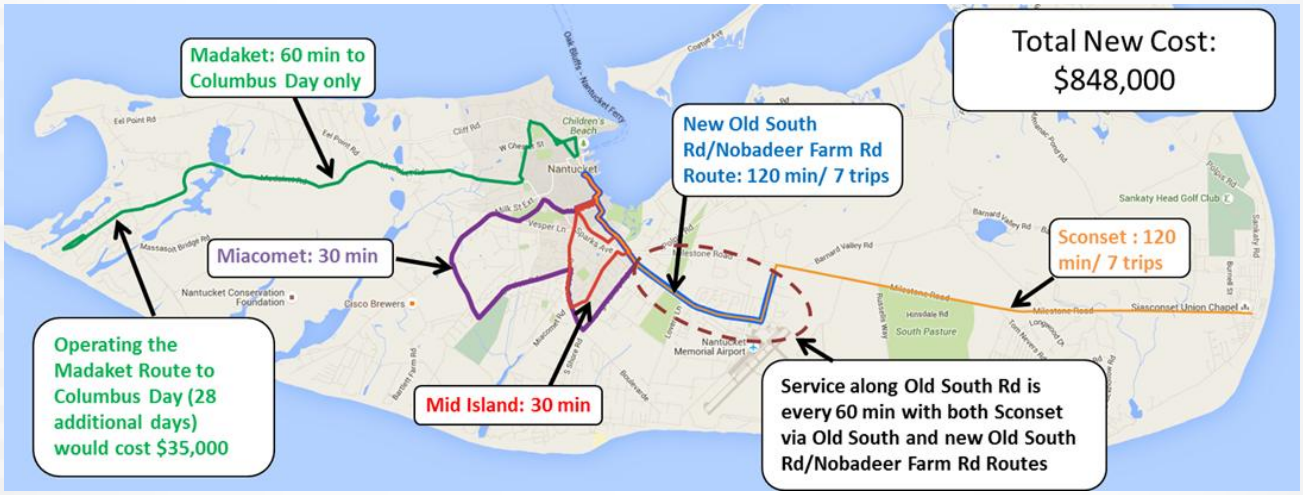
Using the results from the public outreach effort, operational analysis and market analysis, service options were developed. These options were then refined and evaluated by the Steering Committee, resulting in a preferred alternative. The preferred alternative includes establishing year-round service on the Mid Island Loop, Miacomet Loop and Sconset Via Old South Route, establishing a new route that operates in the off-season only called the Old South Rd/Nobadeer Farm Road Route and extending the operation of the Madaket longer into the shoulder season (to Columbus Day). Year-round service would operate 7 days a week for an additional 217 days[1]. The cost to operate the off-season service would be $813,000 plus the $35,000 needed to extend the Madaket service[2].

Service Indicator	Off-Season
Additional days operated	217[1]
Weekday service hours	7AM-9PM
Weekend service hours	8AM-7PM
Number of routes	4
Vehicle requirement	3
Driver requirement	6.9
Projected daily ridership	610

The projected performance indicators for off-season service show that the system would be productive. In almost all indicators, NRTA would out-perform the national average for rural transit providers. Passengers per mile are expected to improve in the off-season which indicates that even with reduced service there is captive ridership. While the off-season service will not exceed the state RTA average for many indicators, they are still within the top half for most of the indicators (most averages are skewed by the larger urban RTAs).

Route Diagnostics	Off-Season	Current NRTA	MA Average	National Rural Average
Farebox Recovery	20%	33%	19%	8%
Passengers per Mile	1.99	1.54	1.56	0.76
Passengers per Hour	15.5	15.9	21.5	10.8
Cost per Mile	$12.21	$8.05	$6.57	$3.04
Cost per Passenger	$6.14	$5.22	$4.22	$7.42
Subsidy per Passenger	$5.65	$3.81	$3.41	N/A

Year-Round Service Projection
362 days/year
431,000 rides


Madaket: 60 min to Columbus Day only
Total New Cost: $848,000
New Old South Rd/Nobadeer Farm Rd Route: 120 min/ 7 trips
Miacomet: 30 min
Sconset : 120 min/ 7 trips
Operating the Madaket Route to Columbus Day (28 additional days) would cost $35,000
Mid Island: 30 min
Service along Old South Rd is every 60 min with both Sconset via Old South and new Old South Rd/Nobadeer Farm Rd Routes

Possible Service Enhancements	Additional Cost
Operate the new route and Sconset via Old South Road Route with 60 minute frequencies	$271,000
Extend weekend service to 9PM	$53,000
Operate Madaket Route service for the entire off-season with 3 trips per day	$62,000

Possible Cost Saving Options	Cost Savings
Do not extend the Madaket Route	$35,000
Operate Mid Island and Miacomet Loops every 60 minutes instead of 30	$271,000
Operate 4 trips daily on Sconset via Old South Road Route instead of 7	$62,000
Only extend current shoulder[3] routes to begin at the Daffodil Festival and end after Christmas Stroll	$524,000

Photos by Susan Richards, SR Concepts

[1]Current NRTA WAVE bus service is operated 145 days per year.
[2]The total costs do not include farebox revenue, which would offset some of the cost.
[3]Ferry Connector, Mid Island and Miacomet Loops, Sconset via Old South Road Route

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INTRODUCTION

The purpose of the Nantucket Year-Round Transit Study was to evaluate the feasibility of providing year-round fixed route bus service and to develop recommendations if the service was found to be feasible. Currently fixed route bus service is provided seasonally from mid-May through early October. The recent Regional Transit Plan[1] acknowledged the potential need for year-round bus service to meet the demand of a growing year-round population. In just four years the year-round Island population has grown by 6.7%. This report summarizes the analyses and outreach effort completed as part of this study[2] and provides recommendations and a service plan for year-round service.

PUBLIC OUTREACH SUMMARY

An outreach strategy was developed to reach a diverse group of stakeholders including current NRTA riders, representatives of Island agencies and organizations, year-round residents and employees. All outreach materials were available in both English and Spanish. The strategy included: a stakeholder meeting, public workshops, pop-up tables at two busy locations, and a survey.

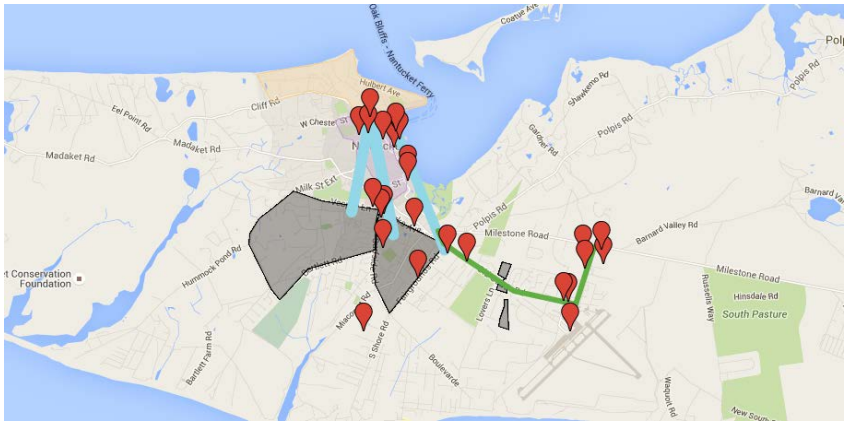

Figure 1: Stakeholder Meeting Findings

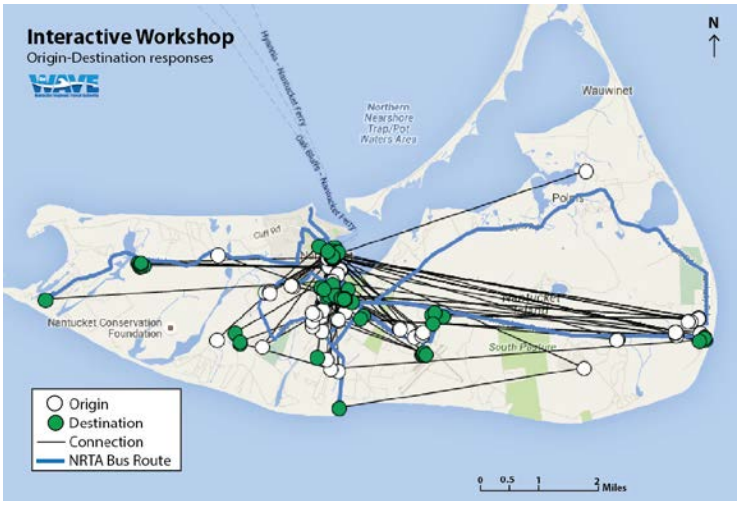

Figure 2: Origin-Destinations from Public Outreach

Stakeholder Meeting

NRTA reached out to various stakeholders, including community, business, educational and religious organizations, to participate in a meeting discussing the transportation needs on the Island. During this meeting, the stakeholders were presented an overview of the study, but the primary purpose of the meeting was an interactive discussion to understand the level of interest in year-round bus service and to get an idea of the mobility needs on the Island. Sixteen agencies/orgranizations/community groups were represented at the meeting.

[1] Massachusetts Regional Transit Authorities (RTAs). Regional Transit Plans for each Authority, including NRTA. 2015.

[2] Additional details regarding the analyses and findings can be found in Appendices A-D.

Public Workshops

Two interactive public "open house" workshops were held in mid-January 2016 where attendees were encouraged to learn more about the study and provide input through a series of stations. These stations provided information about Nantucket, the WAVE, the study's market analysis, and maps to pinpoint important destinations or transit connections. Participants were also provided the opportunity to complete the survey designed for the study. Fifty people attended the public workshops. Some general findings from these events were:

- Most of the activity on the Island in the off-season is concentrated in the mid-island area
- The vast majority of participants referenced a strong need for bus service in the off-season

Pop-up Tables

Two pop-up tables were set up in mid-January 2016 at the Nantucket High School and at Stop & Shop on Sparks Avenue. The purpose of these tables was to engage community members who otherwise may not have participated through the other outreach events. Flyers with information about the study and a link to take the online survey were distributed at the tables and paper surveys were available for those who preferred to take it in person. In total, 54 people participated at the High School, 27 people participated at Stop & Shop, and 81 paper surveys were collected at these events.

Survey

In addition to these outreach events, a survey was developed to understand the public's experience with the WAVE, interest in year-round service and other unmet transit needs. The survey was available online through SurveyMonkey in English and Spanish, and hard copy surveys in English and Spanish were also produced. A post card mailer with a link and instructions to access the survey was mailed to every residential and business address (10,749 addresses) on the Island. The survey was also distributed at outreach events, advertised in the Inquirer and Mirror, Mahon About Town, and on the local radio station, and shared through social media. In total 1,132 responses were received between all outreach efforts. Below are some key findings from survey responses.

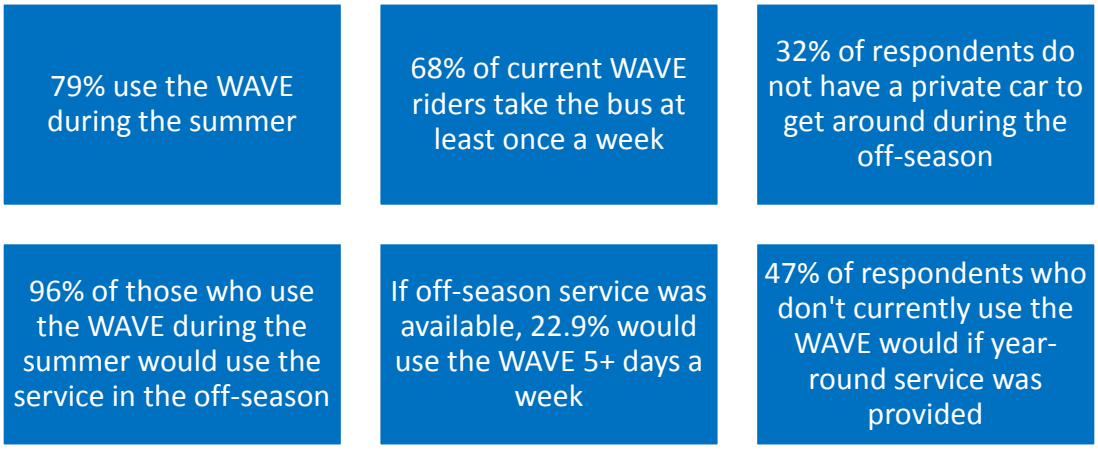
79% use the WAVE during the summer
68% of current WAVE riders take the bus at least once a week
32% of respondents do not have a private car to get around during the off-season
96% of those who use the WAVE during the summer would use the service in the off-season
If off-season service was available, 22.9% would use the WAVE 5+ days a week
47% of respondents who don't currently use the WAVE would if year-round service was provided

Figure 3: Survey Finding Highlights

Key Findings

Based on the information gathered during the outreach effort, there is strong public support for year-round bus service on the Island. Responses from the public outreach events and survey also indicate that bus service would be utilized frequently if available year-round.

Operational Analysis Summary

Since its inception in 1995, NRTA has expanded its service to provide island-wide seasonal fixed route transit (the WAVE) through ten routes. Service is funded through a mixture of local, state and federal programs for operational and capital assistance. NRTA is also supported through farebox revenue, advertising and local business support for the Ferry Connector.

Average daily shoulder ridership is 2x higher than the system ridership of two other state RTAs that operate year-round service

The WAVE operates ten routes between mid-May and early October (approximately 145 days) using 15 of their 19 revenue vehicles in the fleet. Of the ten routes, there are three distinct service types: commuter routes, community routes, and tourist routes. Some of the routes, particularly the tourist routes to the island's beaches, cease service during the shoulder seasons. Table 1 provides an overview of each route's service hours and frequency during the summer and shoulder seasons.

Table 1: Span of Service Hours by Route

Route Name	Summer		Shoulder	
	Service Span	Headway	Service Span	Headway
Airport Route	10:00 AM to 6:00 PM	20 min	---	---
Ferry Connector	7:00 AM to 10:00 PM	20 min	9:40 AM to 9:00 PM	20 min
Jetties Beach	10:00 AM to 5:45 PM	30 min	---	---
Madaket Route	7:00 AM to 11:20 PM	30 min	7:00 AM to 11:20 PM	60 min
Miacomet Loop	7:00 AM to 12:00 AM	20 min	7:00 AM to 11:30 PM	30 min
Mid Island Loop	7:00 AM to 12:00 AM	15 min	7:00 AM to 11:30 PM	30 min
Sconset via Milestone Road Route	7:15 AM 7:15 PM	60 min	---	---
Sconset via Old South Road Route	7:15 AM 12:00 AM	60 min	7:15 AM to 11:15 PM	60 min
Sconset via Polpis Road Route	10:00 AM to 5:20 PM	1 hr 20 min	---	---
Surfside Beach	10:00 AM to 5:40 PM	40 min	---	---

NRTA operates a fleet of 19 buses, all of which are ADA compliant and were manufactured after 2006. While some of the vehicles are past their Federal Transit Administration (FTA) defined useful life of 7 years, they have *not* exceeded their useful mileage of 200,000 miles, so they are available for year-round service. NRTA can only operate vehicles under 30' in length and 96" in width due to roadway geometry and local constraints. Based on route service hours, NRTA requires 37 full-time operators during the peak summer season between July and Labor Day. During this same period, the daily peak capacity for all routes is 8,298 passengers. Thus, while there is ample capacity to handle existing and future ridership system-wide, there are still times of day and certain locations when/where capacity on a single bus or on a route is an issue.

Route Diagnostics

NRTA is a rural system performing like an urban

To evaluate each route, the following information from NRTA's 2015 records was used: ridership statistics, revenue hours, revenue miles, operating cost, and farebox revenue. In 2015, the WAVE carried almost 300,000 passengers, which is an increase of 9.9% since 2012. The Jetties Beach Route, Sconset via Milestone Road Route and the Ferry Connector (service initiated in 2014) experienced the largest increases in passengers. During the peak summer season, ridership is the highest and averages 2,900 passengers a day. Ridership tapers in the shoulder season to between 850 and 1,250 passengers daily. The drop in ridership is correlated to a drop in service levels. With many of these statistics NRTA WAVE routes perform better than the state average for all Regional Transit Authorities (RTAs). As a whole the system outperforms rural transit providers within New England and nationwide.

Table 2: System-Wide Route Diagnostics

Route Name	Farebox Recovery	Passengers per Mile	Passengers per Hour	Cost per Mile	Cost per Passenger	Subsidy/ passenger
Airport Route	11.2%	0.75	3.78	$13.51	$18.11	$16.08
Jetties Beach	34.2%	6.62	23.83	$19.00	$2.87	$1.89
Madaket Route	35.3%	1.07	13.57	$5.41	$5.04	$3.26
Miacomet Loop	27.5%	1.57	17.05	$6.31	$4.01	$2.91
Mid Island Loop	26.1%	2.03	15.76	$8.80	$4.34	$3.21
Sconset via Milestone Rd	48.6%	1.32	18.56	$4.85	$3.69	$1.90
Sconset via Old South Rd	57.8%	1.46	23.08	$4.33	$2.96	$1.25
Sconset via Polpis Rd	31.6%	0.77	11.53	$4.56	$5.93	$4.06
Surfside Beach	68.8%	2.50	25.85	$6.61	$2.65	$0.82
Fixed Route System Total	**32.6%**[3]	**1.54**	**15.90**	**$8.05**	**$5.22**	**$3.81**
Ferry Connector	90.5%[4]	0.97	2.33	$28.60	$29.42	$2.79

Cost Effectiveness

The farebox recovery ratio for NRTA WAVE is 32.6%, much higher than the statewide average of 19.4%, which includes the urban RTAs with higher ridership and funds received through contracts. According to the *2014 Rural Transit Fact Book* the national average farebox recovery for rural transit service providers is 8%, NRTA is five times better than the average. FTA Region 1 (New England), the average farebox recovery is 6%; Nantucket far exceeds this value too.

NRTAs low subsidy per passenger indicates a financially efficient system

For cost per passenger, NRTA is ranked 5th amongst all RTAs in the state and of the four predominantly rural RTAs in Massachusetts they are ranked second. According to the *2014 Rural Transit Fact*

[3] This does not include the Ferry Connector service as it is a free service.
[4] The Ferry Connector was funded by a private source in 2015.

Book the national average for cost per passenger for rural transit service providers is 7.42; NRTA is 41.3% better than the average. In the FTA Region 1, the average cost per passenger is $11.46; Nantucket is 118% better than this average.

The statewide average subsidy per passenger is $3.41, which includes the urban RTAs with higher ridership and funds received through contracts such as those with universities. NRTA is ranked 4th amongst all RTAs in the state and second amongst the rural providers.

Key Findings:

- The performance measures indicate that NRTA operates efficiently and effectively, with service statistics better than New England and national averages for rural transit systems.
- Most of the routes have a farebox recovery ratio of 20% or higher, indicating a financially healthy system.
- The system is operating below maximum capacity on all routes, so there is room to accommodate growing ridership.

TRANSIT MARKET SUMMARY

To help develop service alternatives, a market analysis was prepared to examine the island's existing conditions and to identify areas of potential transit demand. Analyzing the existing market conditions, including demographic, socioeconomic and employment conditions, helps identify areas of the Island with populations that may be more willing to use fixed route transit service. Factors such as age, household income, employment and vehicle ownership are strongly correlated with higher demand for transit service.

20.9% of the island's population is under the age of 18

Nantucket's market is heavily influenced by tourism in the summer months. Although year-round population is estimated to be between 11,000 and 15,000, during the peak summer months it can reach as high as 50,000. Much of the island's population is concentrated in downtown and in the mid-island region although there are some pockets of higher-density residential areas in the Tom Nevers, Sconset and Madaket areas. The pattern of development on the Island is shaped by the vast amount of land that is protected as open space.

13.4% of the island's population is over the age of 65

Certain factors such as age, vehicle ownership, household income and employment are correlated with a higher likelihood of using public transportation. Understanding Nantucket's existing market lends itself to identifying areas of the island with populations that demand and can support fixed route service.

9.2% of the island's population lives below the poverty level

To locate areas with potential transit demand, "transit scores" were calculated to measure how successful a fixed route transit system could be in different areas on the Island. The following factors were used in this analysis:

37.5% of households have only 1 vehicle

-Overall Population Density
-Density of the Population under the age of 18

5.3% of households have no vehicle

-Density of the Population over the age of 65
-Percentage of the Population Living Below the Poverty Level
-Percentage of Zero-Car Households

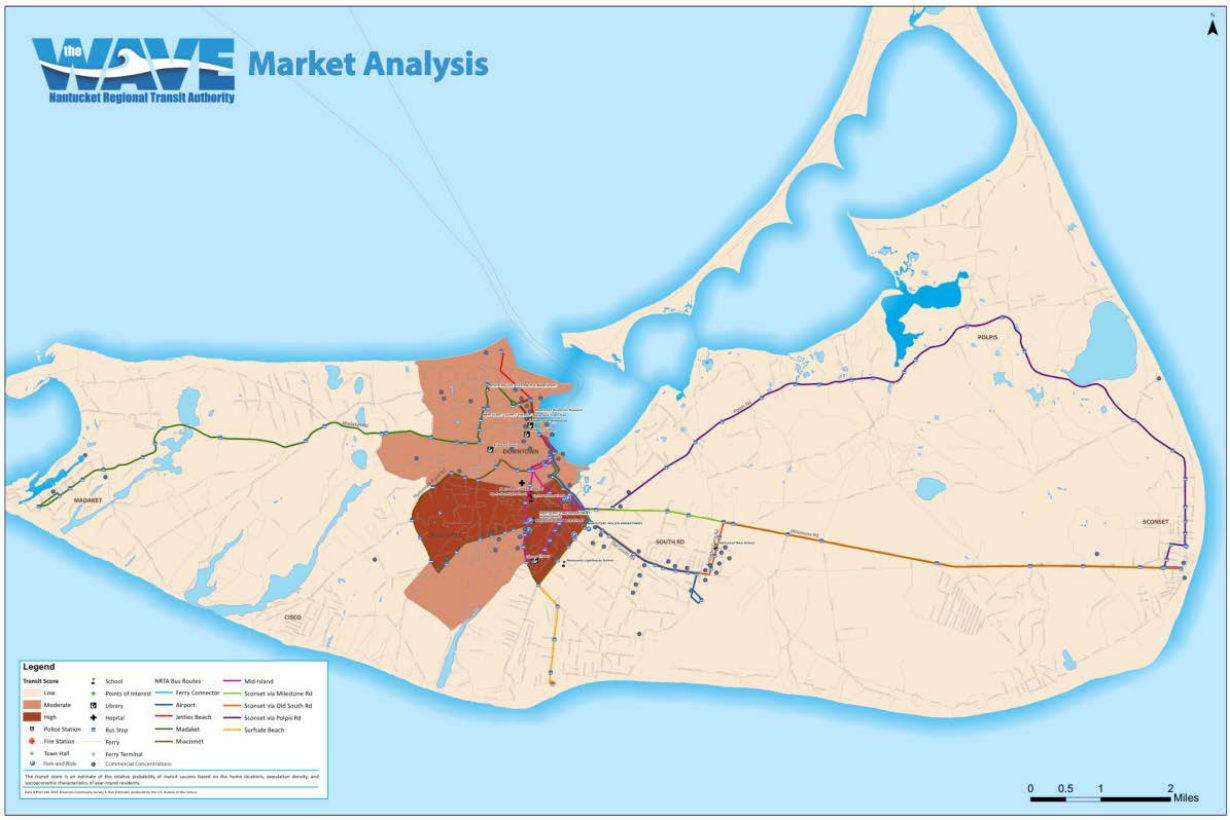

Figure 4: Transit Score Map

Figure 4 represents the results of the transit score analysis that identifies the areas on Nantucket with the greatest probability of transit success. As highlighted in the map, the downtown and mid-island areas have the strongest demand for fixed route service. Residents who live in these areas year-round would benefit from alternate modes of transportation, including year-round fixed route service.

An additional analysis was prepared to estimate the level of demand for fixed route service including capacity, service design, schedules, performance and revenues. A demand model was developed based on household vehicle ownership, average walking distance to bus stops and frequency of operation to estimate the number of trips during the off-season. The off-season trip estimates are nearly as high as the peak season ridership indicating there is a latent demand for year-round transit service.

Figure 5 depicts the estimated level of service demand on the island. This estimation was based on population and employment density. As the density increases, the headway for transit service decreases. In general, the downtown and mid-island areas can support 30 and 60 minute bus service.

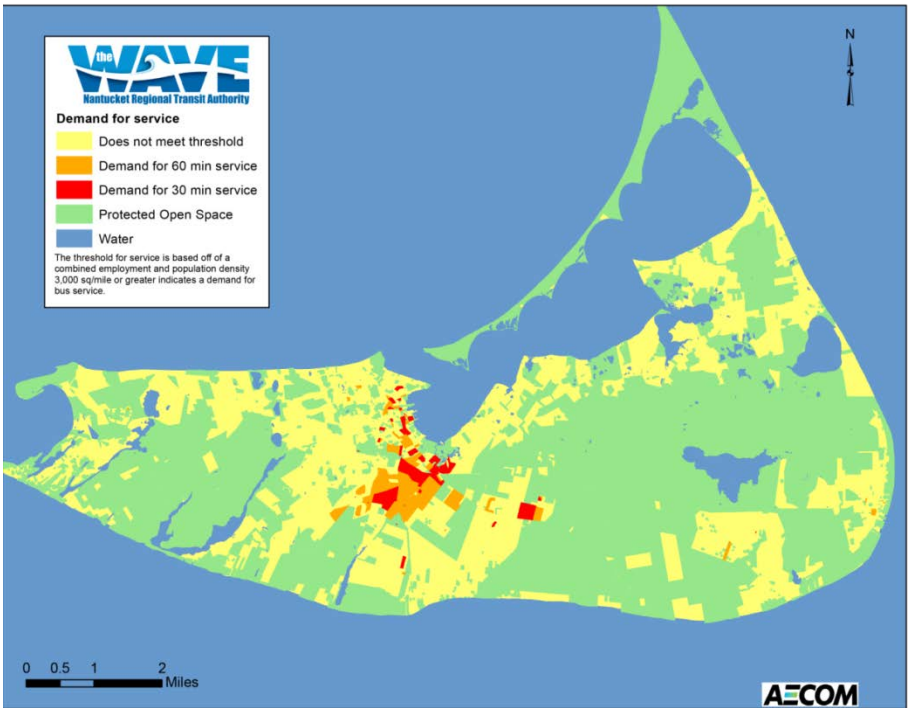
the WAVE
Nantucket Regional Transit Authority
Demand for service
Does not meet threshold
Demand for 60 min service
Demand for 30 min service
Protected Open Space
Water
The threshold for service is based off of a combined employment and population density 3,000 sq/mile or greater indicates a demand for bus service.
N
0 0.5 1 2
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Figure 5: Level of Service Demand

Key Findings:

- The highest demand for service is in and around mid-island and downtown and along Old South Road.
- Over 40% of the households have one car or less and many have more than one person of driving age.
- The ridership projections for the off-season show that a demand does exist.

ALTERNATIVE DEVELOPMENT SUMMARY

A long list of alternatives was developed and evaluated based on information provided through input from the public and by information from the operational and transit market analyses. In general, three conceptual options were examined for proposed routes. Option 1 would provide full off-season service on the Island and service would operate 217 days between mid-October and mid-May with service 14 hours a day, seven days a week. Option 2 would also provide full off-season service, 217 days between mid-October and mid-May and service would operate seven days a week, however weekday service span would be 14 hours and weekend service span would be 11 hours. Also in Option 2 there is less service frequency on certain routes than in the same Option 1 routes. Option 3 would provide service for 84 days during the extended shoulder seasons on the island. Generally, this is between the Daffodil Festival in the spring and through the Christmas Stroll in the winter. The routes that were evaluated were routes that currently operate during the shoulder season with slight variation of set routes. Between the three options and various route alignments, over 20 alternatives were evaluated. Table 3 presents the summary statistics developed for each of the alternatives.

Table 3: Summary of Alternative Development

Option 1

Description	Round-trip Mileage	Round-trip Time	Frequency (Minutes)	Daily Service Span - Weekdays	Daily Service Span - Weekends	Number of Daily Trips	Off-Season Total Revenue Hours	Off-Season Total Revenue Miles	Off-Season Total Operating Cost	Driver Requirements	Vehicle Requirements	Projected Off-Season Ridership	Riders per Day	Passengers per Mile	Passengers per Hour	Cost per Mile	Cost per Passenger
Mid Island Loop	4.1	30	30	14	14		3,038	12,456	$ 288,610	2.45	1	40,507	187	3.3	13.3	$ 23.17	$ 7.13
Miacomet Loop	7	30	30	14	14		3,038	21,266	$ 288,610	2.45	1	42,348	195	2.0	13.9	$ 13.57	$ 6.82
Mid Island and Miacomet Loop Combination (new)	6.5	30	30	14	14		3,038	19,747	$ 288,610	2.45	1	82,855	382	4.2	27.3	$ 14.62	$ 3.48
Old South Road /Nobadeer Farm Turn-Around (new)	7	60	30	14	14		6,076	42,532	$ 577,220	4.9	2	69,223	319	1.6	11.4	$ 13.57	$ 8.34
Old South Road /Milestone Loop (new)	6.3	60	30	14	14		6,076	38,279	$ 577,220	4.9	2	72,695	335	1.9	12.0	$ 15.08	$ 7.94
Sconset via Old South Road Route	17.5	60				4	868	15,190	$ 82,460	0.7	1	60,543	279	4.0	69.8	$ 5.43	$ 1.36
Madaket Route	12.5	60				3	651	8,138	$ 61,845	0.525	1	6,773	31	0.8	10.4	$ 7.60	$ 9.13

Option 2

Description	Round-trip Mileage	Round-trip Time	Frequency (Minutes)	Daily Service Span - Weekdays	Daily Service Span - Weekends	Number of Daily Trips	Off-Season Total Revenue Hours	Off-Season Total Revenue Miles	Off-Season Total Operating Cost	Driver Requirements	Vehicle Requirements	Projected Off-Season Ridership	Riders per Day	Passengers per Mile	Passengers per Hour	Cost per Mile	Cost per Passenger
Mid Island Loop	4.1	30	30	14	11		2,852	11,693	$ 270,940	2.3	1	38,027	175	3.3	13.3	$ 23.17	$ 7.13
Miacomet Loop	7	30	30	14	11		2,852	19,964	$ 270,940	2.3	1	39,755	183	2.0	13.9	$ 13.57	$ 6.82
Mid Island and Miacomet Loop Combination (new)	6.5	30	30	14	11		2,852	18,538	$ 270,940	2.3	1	77,782	358	4.2	27.3	$ 14.62	$ 3.48
Old South Road /Nobadeer Farm Turn-Around (new)	7	60	60	14	11		2,852	19,964	$ 270,940	2.3	1	64,971	299	3.3	22.8	$ 13.57	$ 4.17
Sconset via Old South Road Route	17.5	60				3	651	11,393	$ 61,845	0.525	1	56,824	262	5.0	87.3	$ 5.43	$ 1.09
Madaket Route	12.5	60				2	434	5,425	$ 41,230	0.35	1	4,515	21	0.8	10.4	$ 7.60	$ 9.13

Option 3

Description	Round-trip Mileage	Round-trip Time	Frequency (Minutes)	Daily Service Span - Weekdays	Daily Service Span - Weekends	Number of Daily Trips	Off-Season Total Revenue Hours	Off-Season Total Revenue Miles	Off-Season Total Operating Cost	Driver Requirements	Vehicle Requirements	Projected Off-Season Ridership	Riders per Day	Passengers per Mile	Passengers per Hour	Cost per Mile	Cost per Passenger
Ferry Connector	3.2	40	20	14	11		2,208	18,253	$ 209,760	4.6	2	9,735	116	0.5	4.4	$ 11.49	$ 21.55
Mid Island Loop	4.1	30	30	14	11		1,104	4,526	$ 104,880	2.3	1	14,720	175	3.3	13.3	$ 23.17	$ 7.13
Miacomet Loop	7	30	30	14	11		1,104	7,728	$ 104,880	2.3	1	15,389	183	2.0	13.9	$ 13.57	$ 6.82
Sconset via Old South Road Route (3A)	17.5	60	60	14	11		1,104	19,320	$ 104,880	2.3	1	23,436	279	1.2	21.2	$ 5.43	$ 4.48
Sconset via Old South Road Route (3B)	17.5	60	120	14	11		552	9,660	$ 52,440	1.15	0.5	19,236	229	2.0	34.8	$ 5.43	$ 2.73
Madaket Route - Pre-season only (April-May) (3A)	12.5	60	60	14	11		368	4,600	$ 34,960	2.3	1	3,829	46	0.8	10.4	$ 7.60	$ 9.13
Madaket Route - Pre- and post- season (April/May and October/November/December) (3B)	12.5	60	60	14	11		1,564	19,550	$ 148,580	2.3	1	16,272	194	0.8	10.4	$ 7.60	$ 9.13
Madaket Route - Pre- and post- season (April/May and October/November/December) (3C)	12.5	60	120	14	11		782	9,775	$ 74,290	1.15	0.5	5,743	68	0.6	7.3	$ 7.60	$ 12.94
Madaket Route - Post-season to Columbus Day (3D)	12.5	60	60	14	11		368	4,600	$ 34,960	2.3	1	980	12	0.2	2.7	$ 7.60	$ 35.67

Key Findings:

- Year-round service is favorable and it allows the Island residents to have service they can 'build their lives around' because it is a dependable transportation option every day, year-round.
- Operating the Mid Island and Miacomet Loops as separate services out-performs combining them into a single route.
- The new Old South Road/Nobadeer Farm Road routing performs similarly regardless of using a loop or turnaround. Therefore the turnaround is favorable as it is direct service.

PREFERRED ALTERNATIVE

After evaluating the service alternatives and discussing the options with the advisory committee, a set of service options was recommended as the preferred alternative. They were recommended for the following reasons:

- The routes serve the areas with highest year-round populations and employment.
- They currently operate during the shoulder season and can utilize existing stops.
- The passengers per mile measure would be at least 2.
- At least 100 riders would be generated per day for each route.

The preferred alternative, as shown in Figure 6, includes establishing year-round service on the Mid Island Loop, Miacomet Loop and Sconset Via Old South Route, establishing a new route that operates in the off-season only called the Old South Rd/Nobadeer Farm Road Route and extending the operation of the Madaket Route longer into the shoulder season (to Columbus Day). Year-round service would operate 7 days a week for an additional 217 days[5] (not including holidays). Weekday service hours would be approximately 7:00 AM – 9:00 PM and weekend service hours would be approximately 8:00 AM - 7:00 PM. The cost to add off-season service and to extend the Madaket Route into the shoulder season would be $848,000 annually, minus revenue from the farebox.

Figure 6: Preferred Alternative

[5] NRTA WAVE service currently operates 145 days per year.

Table 4 lists the options from the preliminary service options summarized in Table 3. The Miacomet Route would continue to leave town using the Broad Street stop in front of the Whaling Museum. The remaining routes would operate using a pulse system on the hour and half hour out of the Greenhound Station. This will facilitate transfers amongst the routes given the reduced service levels. Only three bus bays will be needed at Greenhound; therefore the bus stops along Washington Street will not be utilized in the off-season.

Table 4: Option for Preferred Routes

Route	Option
Madaket Route	3D
Miacomet Loop	2
Mid Island Loop	2
Sconset via Old South Route	2/3B
New Old South Road/Nobadeer Farm Road Route	2

TRANSIT SERVICE PLAN

Operations

The Madaket Route would extend service by 28 days until Columbus Day. In the fall shoulder season the bus will leave from Broad Street, in front of the Whaling Museum, every hour beginning at 7:00 AM on weekdays and 8:00 AM on weekends. Weekdays the last bus would leave Madaket at 8:30 PM and on Weekends 6:30 PM. Table 5 provides the operating characteristics of each of the proposed off-season routes.

Both the Mid Island Loop and Miacomet Loop service would operate every 30 minutes on the hour and half hour from the Greenhound Stop in the off-season. On weekdays the first bus would leave Greenhound at 7:00 AM, the last at 8:30 PM. Weekends they would begin at 8:00 AM with the last at 6:30 PM.

The Sconset via Old South Road Route would leave every two hours from the Greenhound Stop on the even hours. The first bus would leave Greenhound at 8:00 AM and on weekdays the last would leave Greenhound at 8:00 PM and Sconset at 8:30 PM. On weekends the last would leave Greenhound at 6:00 PM and Sconset at 6:30 PM.

The new Old South Road/Nobadeer Farm Road route would also leave Greenhound every 2 hours but on the odd hour (opposite of the Sconset via Old South Road Route). The first weekday bus would leave Greenhound at 7:00 AM and the last would leave Greenhound at 7:00 PM and the Athletic Fields on Nobadeer Farm Road at 7:30 PM. On weekends the first bus would leave Greenhound at 9:00 AM and the last would leave Greenhound at 5:00 PM and the Athletic Fields at 5:30 PM. Between the new Old South Road/Nobadeer Farm Road Route and the Sconset via Old South Road Route there would be service along Old South Road and Nobadeer Farm Road every 60 minutes.

Table 5: Preferred Route Operating Characteristics

Route	Frequency	First Trip (weekday)
Madaket Route	Every hour (60 Min)	7:00 AM
Miacomet Loop	Every 30 min	7:00 AM
Mid Island Loop	Every 30 min	7:00 AM
Sconset via Old South Route	Every 2 hours (120 Min)	8:00 AM
New Old South Road/Nobadeer Farm Road Route	Every 2 hours (120 Min)	7:00 AM

The projected performance indicators for off-season service show that the system would be productive throughout the year (Table 6). These indicators are based off of projected ridership, calculated costs, miles and hours, and assumed revenue based on similar systems. In almost all indicators, NRTA would outperform the national average for rural transit providers. Passengers per mile and hour are expected to improve in the off-season which indicates that even with reduced service there is captive ridership.

While the off-season service will not exceed the state RTA average for many indicators, they are still within the top half for most of the indicators (most averages are skewed by the larger urban RTAs). The farebox recovery is expected to be lower during the off-season due to the higher operating costs and lower ridership. The anticipated recovery ratio is based off the state average, rounded to 20%.

Table 6: Performance Indicators

Route Diagnostics	Off-Season	Current NRTA	State Average	National Rural Average
Farebox Recovery	20%	33%	19%	8%
Passengers per Mile	1.99	1.54	1.56	0.76
Passengers per Hour	15.47	15.9	21.5	10.8
Cost per Mile	$12.21	8.05	$6.57	$3.04
Cost per Passenger	$6.14	5.22	$4.22	$7.42
Subsidy per Passenger	$5.65	3.81	$3.41	N/A

Workforce Requirements

Extending the Madaket Route will require 2.3 additional full-time operators and one additional vehicle through Columbus Day. Operating the full service in the off-season will require 6.9 full-time operators and 3 vehicles. Historically there has been a high turn-over rate for operators due to the seasonality of the service. Having full-time employees could reduce the turn-over rate and reduce training costs each year. In addition to vehicle operators, one manager and one mechanic will be needed.

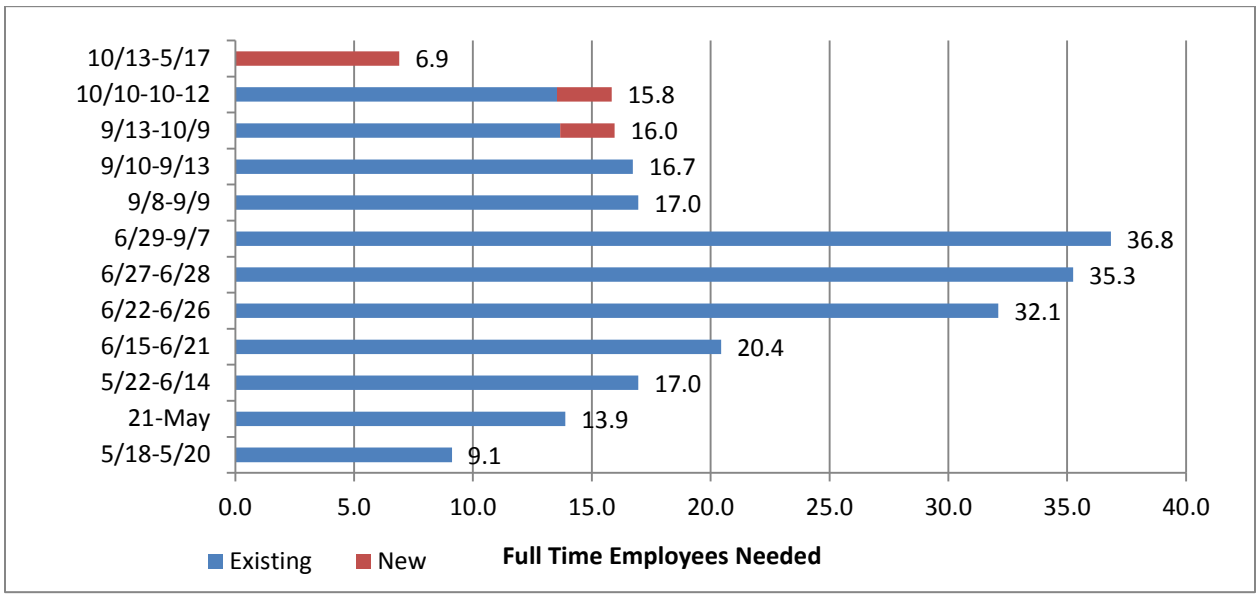

Figure 7: Employee Requirement

Operating Cost Projections

The cost to operate service is based on a projected cost per revenue hour, which is estimated to be $95/hour. This estimate reflects the increased cost associated with operating in the winter and providing benefits for a full-time year-round workforce. The cost to operate the off-season service would be $813,000 plus the $35,000 needed to extend the Madaket service to Columbus Day. This cost estimation does not include any farebox revenue that would off-set the operating cost. The cost of adding off-season service would be $848,000 annually, an increase in the annual budget for fixed route services by 55%. See Table 7 for a cost breakdown by route.

Table 7: Operating Costs for Recommendations

Route	Cost
Madaket Route	$35,000
Miacomet Loop	$271,000
Mid Island Loop	$271,000
Sconset via Old South Route	$135,500
New Old South Road/Nobadeer Farm Road Route	$135,500
Total	**$848,000**

There are possible service enhancements and cost saving options that could be incorporated based on available funding. Enhancements to the recommendations include extending weekend service until 9:00 PM, operating the Madaket Route year-round, and improving the frequency on the Old South Road Routes (see Table 8). Cost saving options include decreasing frequencies, not extending the Madaket Route in the off-season, or operating only an extended shoulder season instead of year-round (see Table 9).

Table 8: Possible Service Enhancements

Possible Service Enhancements	Additional Cost
Operate new Old South Road/Nobadeer Farm Road Route and Sconset via Old South Road Route with 60 minute frequencies, which results in 30 minute frequency along the Old South Road Corridor	$271,000
Extend weekend service to 9PM on the Mid Island and Miacomet Loops and on the new Old South Road/Nobadeer Farm Road Route	$53,000
Operate Madaket Route service for the entire off-season with 3 trips per day	$62,000

Table 9: Possible Cost Saving

Possible Cost Saving Options	Cost Savings
Exclude Madaket Route service extension	$35,000
Operate Mid Island and Miacomet Loops with 60 minute frequency instead of 30 minute frequency	$271,000
Operate 4 trips daily on Sconset via Old South Road Route instead of 7	$62,000
Only extend current shoulder routes (Ferry Connector, Mid Island and Miacomet Loops, Sconset via Old South Road Route) to begin at the Daffodil Festival and end after Christmas Stroll	$524,000

Fare Policy

To generate revenue for the service NRTA could apply its current fare policy and offer single fares as well as the variety of day passes and discounts currently offered. Since the Old South Road/Nobadeer

Farm Road Route is a new route, a single-fare could be established. It is recommended that $2 be used as this route is very similar to the Airport Route, which is offered in the summer with the same fare.

It is strongly recommended that the long-term pass structure be altered to reflect year-round service. The Season pass should be limited to Memorial Day – Columbus Day and a new year-round pass could be offered for $150. The senior/disabled and veteran/active military passes should be offered at year-round and seasonal rates. The seasonal rate could be $50 and year-round $80. The Commuter Pass cost could remain the same but only be valid during the season from Memorial Day to Columbus Day. The Nantucket Student Pass could be increased to $80 and be a year-round pass only. The "Other" Student Pass could be $80 for the seasonal only and $110 for year-round.

Figure 8: Proposed Pass Structure

Pass Type	Current Cost	Proposed Cost
Season Pass	$90	$90 seasonal
Commuter Pass	$80	$80 seasonal
Nantucket Student Pass	$50	$80 year-round
Other Student Pass	$80	$80 seasonal/ $110 year-round
Senior/Disabled	$50	$50 seasonal/ $80 year-round
Veterans/Active Military	$50	$50 seasonal/ $80 year-round
Year-Round Pass	N/A	$150

Capital Requirements

To operate the off-season service, 3 buses will need to be utilized, with two active spares to maintain service in case of a breakdown or routine maintenance. NRTA can utilize their existing fleet and will not need to purchase additional vehicles. Waiting shelters and benches should be installed at high activity stops, if not already in place, to protect passengers from the winter elements. The current NRTA operations and maintenance facility is designed to operate during warm weather only and is not heated. Investments will need to be made in the facility to upgrade and provide heat. Vehicles should be stored inside whenever possible to protect them from the elements and reduce start-up time in the mornings.

Ridership Projections

Average daily ridership is projected to be 610 passengers; this is approximately 72% of the daily ridership during the fall shoulder season with just 65% of fall shoulder season service hours. This indicates that many of the riders in the fall season are year-round residents. The Mid Island and Miacoment Loops are projected to have the highest ridership (Figure 9). The total off-season ridership is projected to be 132,370; current annual ridership is nearly 300,000. Based on the projections, off-season ridership would account for 31% of overall ridership for NRTA and 38% of service provided.

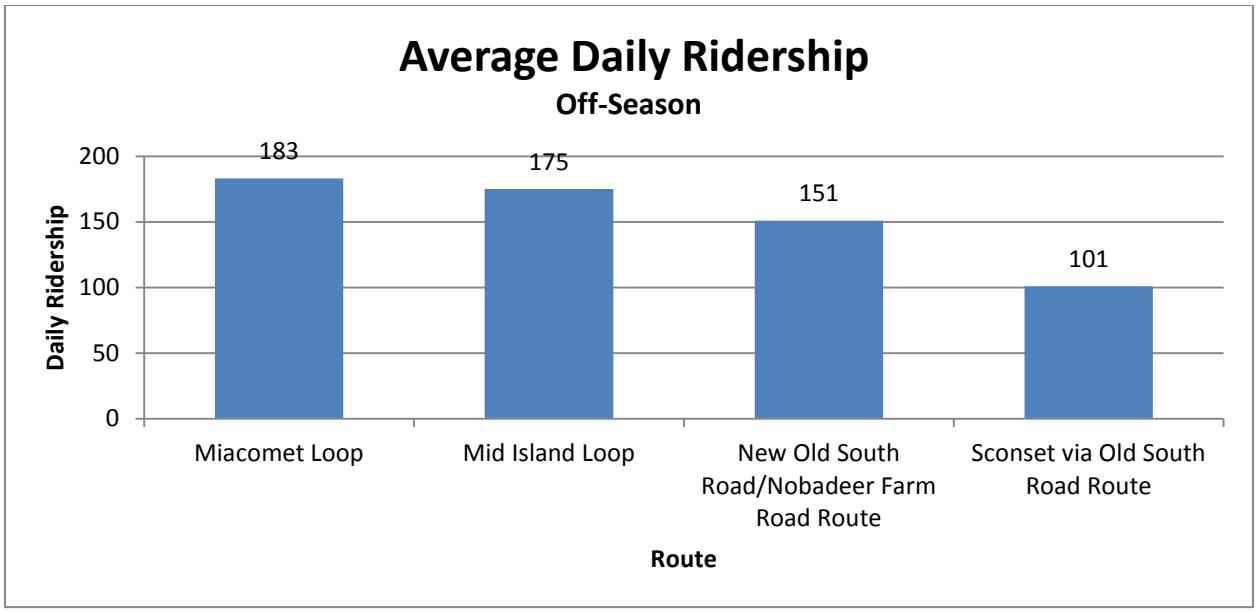

Figure 9: Off-Season Daily Ridership by Route

Implementation Plan

The implementation of service is dependent on obtaining funding but operationally could begin within 6 months of obtaining funding. There are steps that need to be taken in order to ensure implementation. The steps are outlined below:

1. Adopt a Year-Round Service Plan
    - Routes
    - Schedule and operating hours
2. Develop a funding plan
    - Include multiple funding sources to increase likelihood of long-term sustainability
3. Develop a capital plan
    - Upgrade the maintenance/operations facility
    - Finalize placement and quantity of signs, benches and shelters as needed; considering both new stop locations and added shelter/amenities for waiting in inclement weather
    - Order signs, benches and shelters
4. Develop an operations plan
    - Driver schedules
    - Discuss agreements with local facilities as needed
    - Set up year-round real-time bus information
    - Assign responsibilities for plan components
    - Reach out to stakeholders
5. Implementation
    - Install signs, benches and shelters
    - Create an off-season rider guide
    - Distribute schedules and other informational materials

- Advertise the new service availability
- Add service information to the NRTA website
- Hire full-time operators

Other Needs/Requirements

In addition to operating the routes year-round there are a few items NRTA will need to address prior to starting year-round service in order to maintain service. Many of these items are related to operating in cold climates. The remaining items are current practices that will need to change because a shutdown of service will not be needed:

- Establish policies and procedures for cancelling service due to extreme winter weather conditions
- Arrange for plowing the NRTA facility, stops and Greenhound
- Add shelters/waiting areas or work with local business owners to allow riders to wait inside during inclement weather
- Maintenance for bus stop signs/posts since they will be left out in the winter months
- Adjust the policy on removing benches at stops
- Heat the maintenance facility
- Provide indoor storage for all active vehicles in the off-season to prevent gelling of the diesel fuel and eliminating snow removal of vehicles
- Determine whether to keep Greenhound open and staffed year-round; continue to rent out in the off-season or to keep it un-staffed but to allow passengers to wait inside
- Work with Transloc, the bus tracker, to enable year-round functionality

There are challenges and decisions to be made with implementing year-round service but there are also benefits that extend beyond serving the community. Benefits would include bulk purchasing of parts, schedules and other items, eliminating the need to spend staff time removing benches, eliminating the costs associated with off-season shutdown and start-up, and the employment of year-round operators which reduces the amount spent on training new operators each year.

Funding Options

Funding transit service with funds from a variety of sources is fundamental to the sustainability and longevity of service provision. To that end, funding opportunities on a local scale are discussed in addition to funding programs through the state and federal government. Note that fares generated by customers paying to use the service are projected to account for approximately 20% of the annual operating costs. Possible funding sources to recover the remaining operating costs (annual) as well as to cover the necessary capital costs (one-time or as-needed) include:

- Local
    - Increase Local Assessment (RTA funding source assessed to Town of Nantucket)
    - Town Meeting (would need to vote an override or warrant article)
    - Implement on-street paid parking
    - Park and Ride Lot (long-term/seasonal passes)
    - Hospitality/other local tax
    - Partnerships
- State
    - Transit funding (currently level funded for FY2017)

    - Gas tax dedicated to transit (long-term legislative issue)
- Federal (FTA)
    - 5311 Rural Funds (level or decrease in funding)
    - 5310 Enhanced Mobility for Seniors and Individuals with Disabilities (can be used to purchase transportation services from NRTA by non-profit organizations)

Performance Evaluation

NRTA currently has a set of performance measures with which they track service. Performance measures serve as a guide to evaluate the success of a transit service. A new set of performance measures will be established for the off-season service and recommendations for benchmarks are provided below. One of the most important things to consider when establishing a new service is a monitoring program. Once a new route or service has been implemented, it should be monitored for an initial period to evaluate its performance. At the onset the routes may not meet the benchmarks set forth, but as the service becomes more popular it may. Year-round service should be implemented for a period of at least two full seasons in order to garner ridership and to monitor monthly fluctuations. While minor changes such as timing can be made to the routes within the initial period, large changes should be avoided. On-time data should be checked randomly to ensure that performance remains acceptable; a new service that has low on-time performance will have a difficult time attracting and maintaining ridership. Approximately halfway through the initial period (one season) a passenger survey of the route should be conducted to understand the effectiveness of the route. The routes should continue to be monitored as a 'new route' beyond two seasons if ridership has had continual growth. Once ridership has plateaued the route can be evaluated against the benchmarks below.

Recommended performance measures to monitor off-season routes could include:

- **Passengers/Hour:** Number of total monthly and annual passengers divided by the corresponding revenue-hours.
- **Subsidy/Passenger:** Total expenses minus fare revenue divided by ridership.
- **Farebox Recovery:** The percentage of operating costs covered by fares collected, calculated by the fares collected divided by the cost to operate the route.
- **Cost/Revenue-Hour:** An excellent indicator of efficiency is cost per revenue-hour of service. Costs per hour should be analyzed by route and compared to overall system averages.
- **Late Trips:** The percentage of fixed route trips which operate late or are missed should be recorded and reported. The recommended standard for late trips is any trip that is more than five minutes behind schedule.
- **Service/Road Calls:** the number of service/road calls divided by the number of revenue miles. This measure is typically measured for the entire system and not individual routes. This monitors routine maintenance and vehicle performance.
- **Accidents/100,000 miles:** Measure of driver safety. There must be a standard practice for defining what an accident is.

The aforementioned performance measures can be used to create benchmarks for service in the off-season. The benchmarks will help NRTA track progress and set goals for the performance of the routes. These benchmarks should be seen as short-term goals that should be re-evaluated at set intervals—at least every five years—to ensure that the expectations for the routes are consistently evolving. If a specific benchmark has been greatly exceeded during the first two years of operation, the criteria should

be changed to provide a progressive target for the service. The following benchmarks for off-season service were determined by national best practices, examining peers, current performance and anticipated performance:

- Passengers per hour = 12 or higher
- Subsidy per passenger is $5 or less
- Cost per revenue hour of 50% of the off-season average or higher
- 95% on time on-time performance or better
- Cost per revenue hour should not exceed $95 by more than ten percent
- Annual farebox recovery of 20% or greater, with off-season being 8% or greater during the initial period.

Appendix A – Outreach Summary Technical Memorandum

NRTA Year-Round Bus Service Study

Outreach Summary

Technical Memorandum

Prepared for

Nantucket Regional Transit Authority

Prepared by

AECOM Technical Services Inc.

January 2016

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PUBLIC OUTREACH OVERVIEW

For the public outreach effort, NRTA used a multifaceted approach to gather public input including a series of "open house workshops" with interactive mapping stations, pop-up tables, a stakeholder meeting and an online survey. This entire study is guided by a Project Advisory Committee (PAC). The PAC includes representatives from NRTA, Town of Nantucket Planning Department, MassDOT, and ReMain Nantucket. The PAC was integral in reaching out to and interacting with the community on behalf of this study.

The open house workshops were designed to be informative, educational, and interactive for participants and were used to gather public input on where people would go using the NRTA WAVE bus service in the off season. Two interactive workshops, 2 pop-up tables and a stakeholder meeting were held over the course of two days in January. The dates and times of the locations of the open huose workshops and pop-up tables were:

- Monday, January 11 - Stakeholder meeting at Dreamland, 1:30-3:30pm
- Monday, January 11 – Open House Workshop at Boys & Girls Club, 6:30-8:30pm
- Tuesday, January 12 – Open House Workshop at Boys & Girls Club, 11:00am-1:00pm
- Tuesday, January 12 – Pop-up table at Nantucket High School , 2:00pm-3:00pm
- Tuesday, January 12 – Pop-up table at Stop & Shop, Pleasant St. , 3:30pm-5:00pm

To reach as many and diverse members of the public as possible, NRTA prepared an outreach strategy to inform people about the upcoming open house workshops and survey. This strategy included an announcement on the NRTA website and others, social media, radio ads on local radio stations, ads in the *Inquirer and Mirror* and *Mahon About Town*, two prominent distribution media outlets used on Nantucket, press releases, the Town Manager's monthly newsletter, a mailer, and email blasts.

A mailer was sent to every registered business and residential address on Nantucket (10,749) using Every Door Direct Mail with information about the upcoming events and a link to the survey (see Figure 1). Targeted email blasts were sent to a large and diverse group of stakeholders, including: social service groups, church groups, business associations, restaurants, senior centers, municipal officials, chamber of commerce, and more. Flyers were posted at key locations in English and Spanish. In addition, information about the events was posted on social media and widely "shared" and "liked" by other organizations' Facebook pages. Finally, word-of-mouth was employed as NRTA Project Advisory Committee members spoke with various groups from Nantucket in their day-to-day business interactions.

WANT TO RIDE
the WAVE
YEAR ROUND?
NRTA Year-Round Bus Service Study
CHECK IT OUT AT www.surveymonkey.com/r/NRTAbus OR SCAN THIS CODE!
The NRTA WAVE is conducting a study to determine the feasibility of year-round bus service.
ONLINE SURVEY
GO TO: www.surveymonkey.com/r/NRTAbus OR SCAN:
PUBLIC INPUT SESSIONS
Please attend one of our Open-House Style Interactive Public Workshops:
• Monday, January 11, 2016; 6:30 PM - 8:30 PM
• Tuesday, January 12, 2016; 11:00 AM - 1:00 PM
Location: Boys & Girls Club, 61 Sparks Avenue
If year-round service is determined to be feasible, an implementation plan will be developed and presented to the public in February 2016.
PRSRT U.S. POSTAGE PAID ECOM RETAIL
Local Postal Customer

Figure 1: Mailer. Top - Front. Bottom - Back

Stakeholder Meeting

An invitation was sent out to 17 stakeholder groups to attend the meeting. The group was comprised of business, community, school, religious, and human service organizations. Sixteen individuals attended the meeting. The meeting began with an overview of the study including the goals and objectives, project timeline and work conducted so far. After the presentation, the stakeholders were encouraged to partake in a group discussion about year-round bus service. The goal of the meeting was to obtain a better understanding of the needs and concerns of the stakeholders' employees, students, members and patrons. Discussion topics included:

- Interest in year-round service
- Requests for transportation
- Frequently visited destinations
- Transportation challenges
- New opportunities created by year-round bus service
- Potential funding partnerships

The following comments were collected in during the stakeholder discussion:

- Taxi impact – not significantly impactful, users could take combination of taxi/bus for shopping
- Year-round bus service would benefit adult education locations in downtown and airport (Candlewick Corner) areas in the day and evening
- Year-round bus service would benefit 60-70 year olds living alone who want recreational trips to various locations or the senior center; seniors are the fastest growing segment of the population
- A connection from mid-island to airport area is a need
- The Nobadeer Farm Road area is a need for after-school sports and activities; the school bus cannot provide service to recreation fields and some parents cannot get their students from the school to the athletic fields
- There are several new developments going in off of Old South Rd; some are lower income housing developments
- The mid-island area and downtown are where most residences and destinations are located
- Stop & Shop is a huge destination Year-round bus service must connect to the ferries
- Even in the winter there are parking issues downtown

As the stakeholders spoke about the needs of their employees, students, members and patrons their response were captured in Google's My Maps. Points of interest were noted as well as areas where development was occurring, areas of density, and connections. This data is displayed in Figure 2.

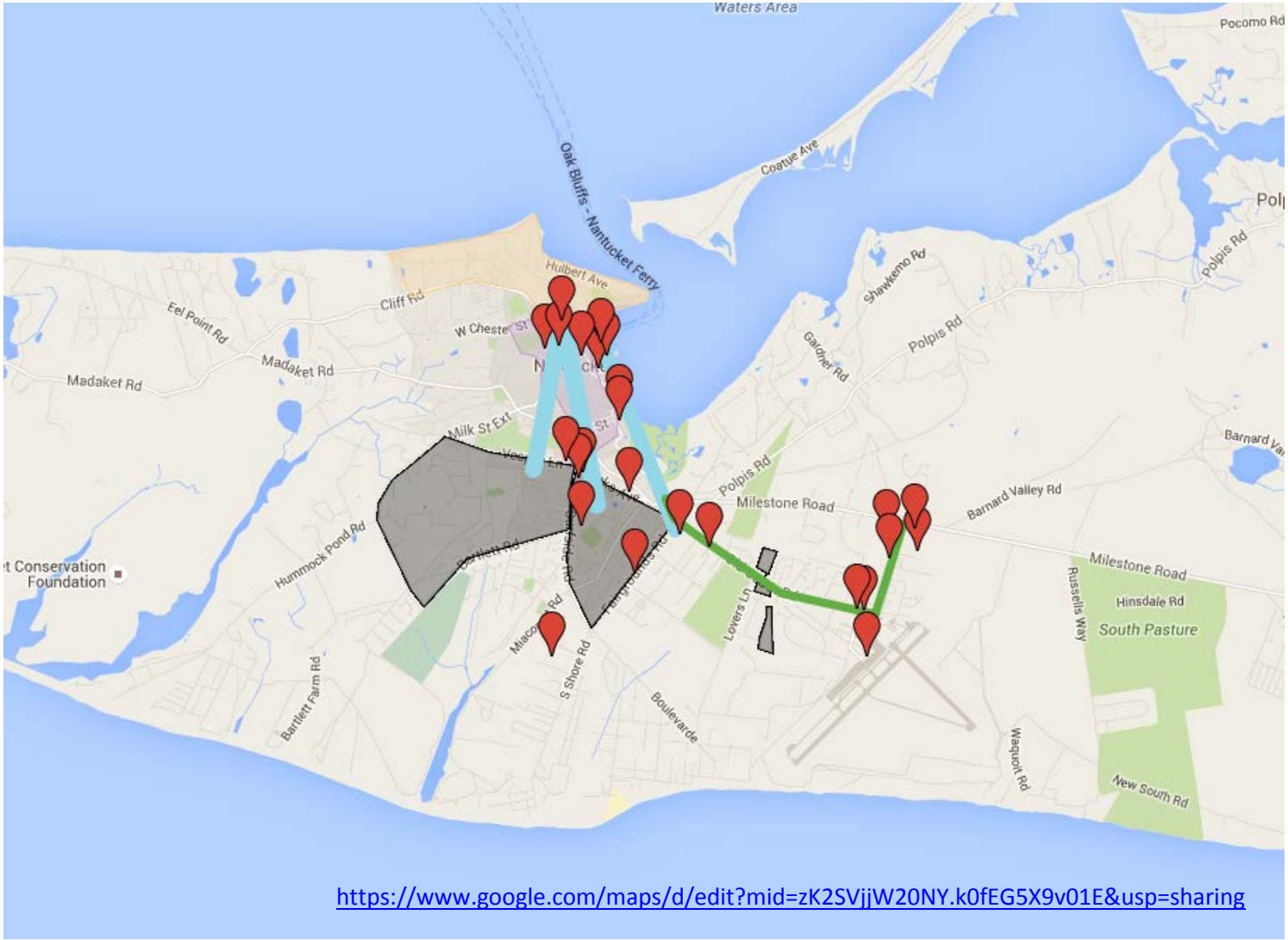


Figure 2: Stakeholder Meeting Responses

Public Workshops

The format of the open house workshops was designed to be interactive with multiple ways in which people could provide their thoughts. Each open house workshop had 5 stations. The first station was an introduction station with a sign-in sheet, agenda and a board with information on the goals and objectives of the study. The second station gave participants the opportunity to fill out a paper version of the online survey if they had not done so already. The survey was supplied in both English and Spanish. The third station had a large map of Nantucket and participants were asked to put a white dot at their home location and green dots at where they would want to go using the WAVE in the off season. Connections were then drawn between the home and multiple destinations to create origin-destination maps. The fourth station had two informative boards about the WAVE and Nantucket. The first map at Station 4 had operational information about the NRTA WAVE current bus service and how each route performs. The second map showed the market analysis including demographic and socioeconomic characteristics of the community through the transit score[1]. The last station was "Planner for a Day" which gave participants a chance to highlight areas of importance, connections, and needs. The feedback provided by participants at the open house workshops was constructive and informative. Almost 50 people attended the open house workshops. Summarized below is the input received at interactive mapping Stations 3 (Origin-Destination) and 5 ("Planner for a Day").

WANT TO RIDE the WAVE YEAR-ROUND?
NRTA Year-Round Bus Service Study
Goals and Objectives:
Goal 1: Determine the feasibility of year-round service
•Conduct a survey to gauge interest
•Evaluate existing operating conditions for each route
•Perform a demographic analysis to determine unmet need
•Project future demand for service
Goal 2: Examine impacts of year-round service on operations and the environment
•Determine new costs associated with operating service in the winter
•Estimate environmental impacts
Goal 3: Develop service alternative
•Develop 3 alternatives with service characteristics, costs, ridership projections, environmental impact and workforce needs
•Recommend a preferred alternative based on evaluation matrix scoring and public feedback
•Create a road map to implementing the preferred alternative
•Identify funding sources for the preferred alternative
Study Schedule:
Study Begins
Last Day to Complete Survey
Presentation of Recommendations
12/1
1/11 & 1/12
1/17
Mid Feb.
Early March
Public Workshops
Development of Options

Figure 3: Goals and Objectives Board

Origin –Destination Patterns

Sixty-two origins[2] and 101[3] destinations were collected at Station 3 at the two open house workshops. The three most common destinations were downtown (30.3%), the Stop & Shop on Sparks Avenue (18.6%), and the Hospital and ferry docks (5.9% each). Other destinations included the schools, dump/DPW, Ferry Connector park-and-ride, athletic fields off of Nobadeer Farm Road, Bartlett Farm, Sconset, Madaket, churches, laundromat and others. The majority of respondents indicated they lived in the mid-island area (22.6%), downtown (22.6%), along Old South Road (9.7%) or in Sconset (17.7%). The

[1] The transit score is an estimate of the relative probability of transit success based on the home locations, population density, and socioeconomic characteristics of year-round residents.

remainder (27.4%) lived along Hummock Pond Road, Tom Nevers, off of South Shore Road, Madaket or Polpis.

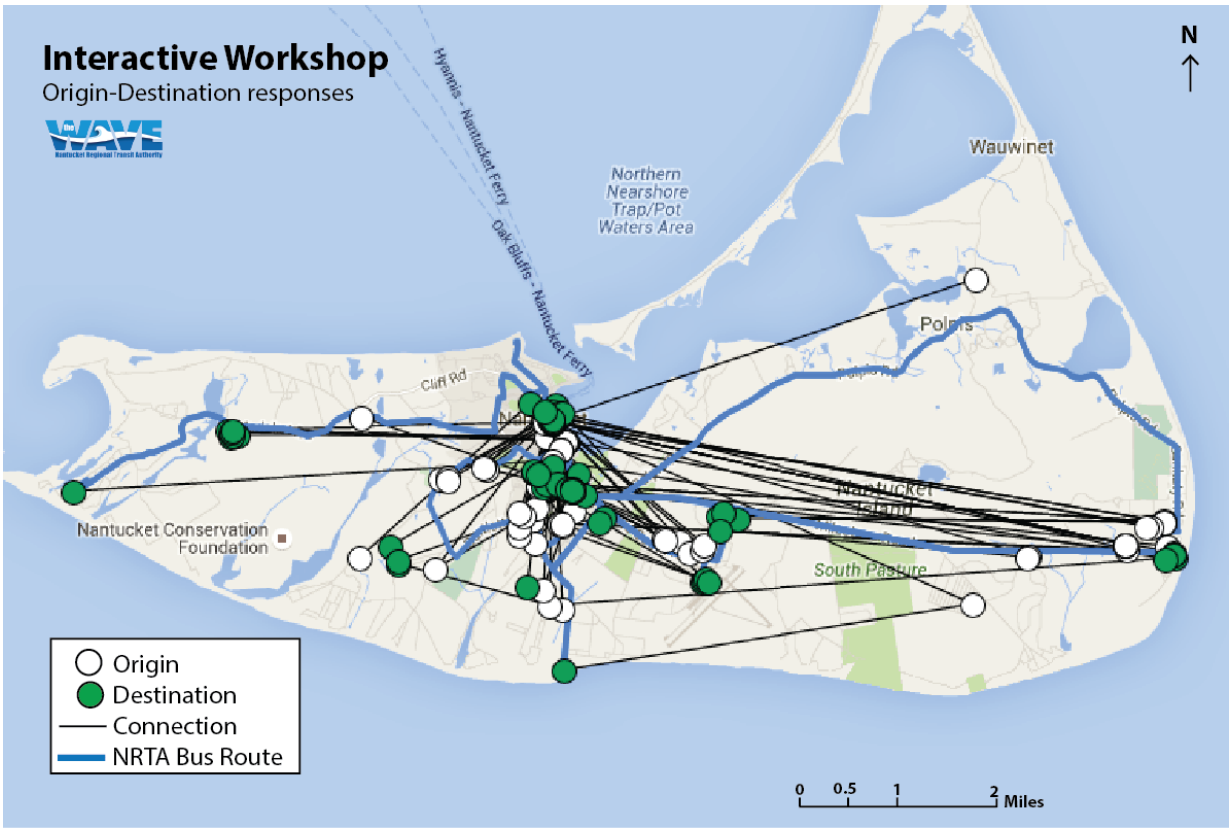


Figure 4: Interactive Workshop Origin-Destination Map

A closer look at origin-destination connections shows that most of the activity is concentrated in the mid-island area (Figure 5). Outside of the mid-island area, the largest connection was from Sconset to Downtown.

[2] This is higher than the number of attendees because in some cases only one individual from a household was able to attend but they stated that other members in their household would use the WAVE in the off season.
[3] Respondents could have multiple destinations. Destinations were any place that they would go at least once a week using the NRTA WAVE bus.

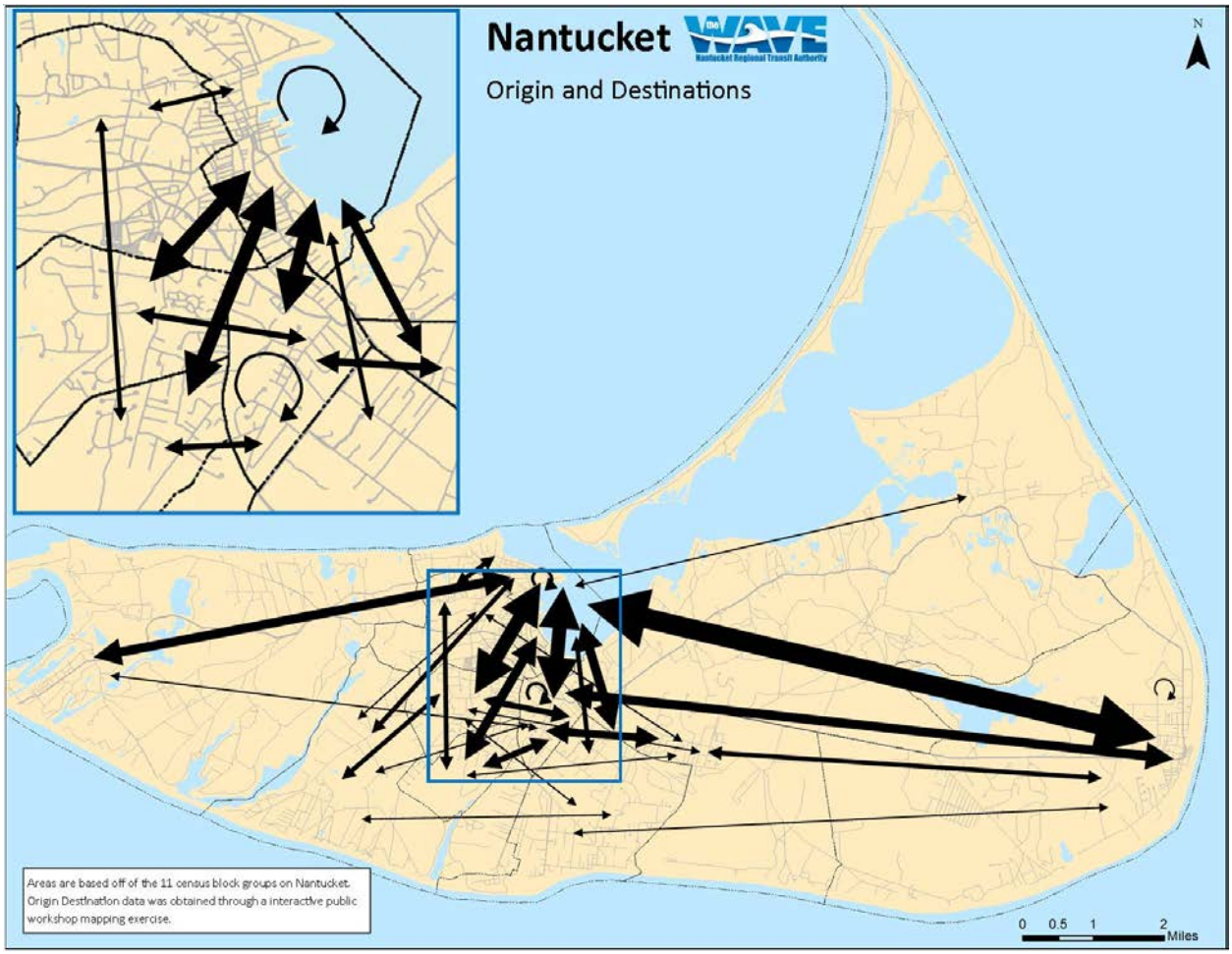

Nantucket
Origin and Destinations
N
Areas are based off of the 11 census block groups on Nantucket.
Origin Destination data was obtained through a interactive public workshop mapping exercise.
0 0.5 1 2
Miles

Figure 5: Origins and Destinations

Planner for a Day

At the 5th Station, a large map of the island was rolled out on a table and workshop participants were asked to identify important destinations and connections on the island, where they would put service in the off season if they were planning the service, and for any other thoughts that came to mind with regard to bus service in general and on Nantucket in particular. As the questions were very broad, the responses and response types varied dramatically. The groups of participants varied greatly from the evening to the daytime workshops as well, which also lent to variety in discussion and mapping responses. As a general rule, members of the public interested in the study, including both supporters and non-supporters of transit service, attended the evening meeting and regular NRTA WAVE riders attended the day-time workshop.

Figure 6 is a map of the evening workshop "Planner for a Day" exercise. As this group was primarily non-riders and members of the public interested in the study, the majority of the items placed on the map were major destinations and residential concentrations as well as areas of proposed new development.

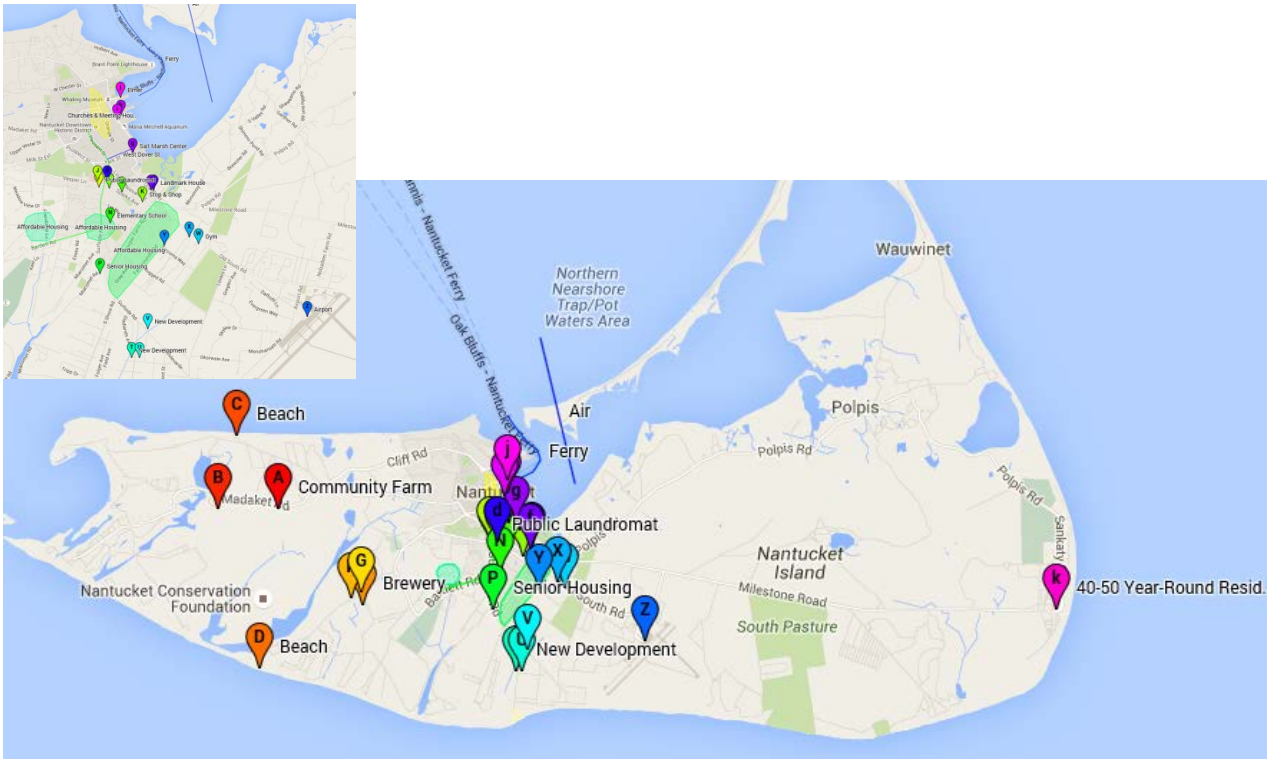


Figure 6: Evening Workshop "Planner for a Day" Map

Figure 7 is a map of the daytime workshop "Planner for a Day" exercise. This group was comprised primarily of existing riders and as such, the map includes proposed service areas and general comments on service-related topics and suggestions for improvements to existing service and for implementing year-round service.

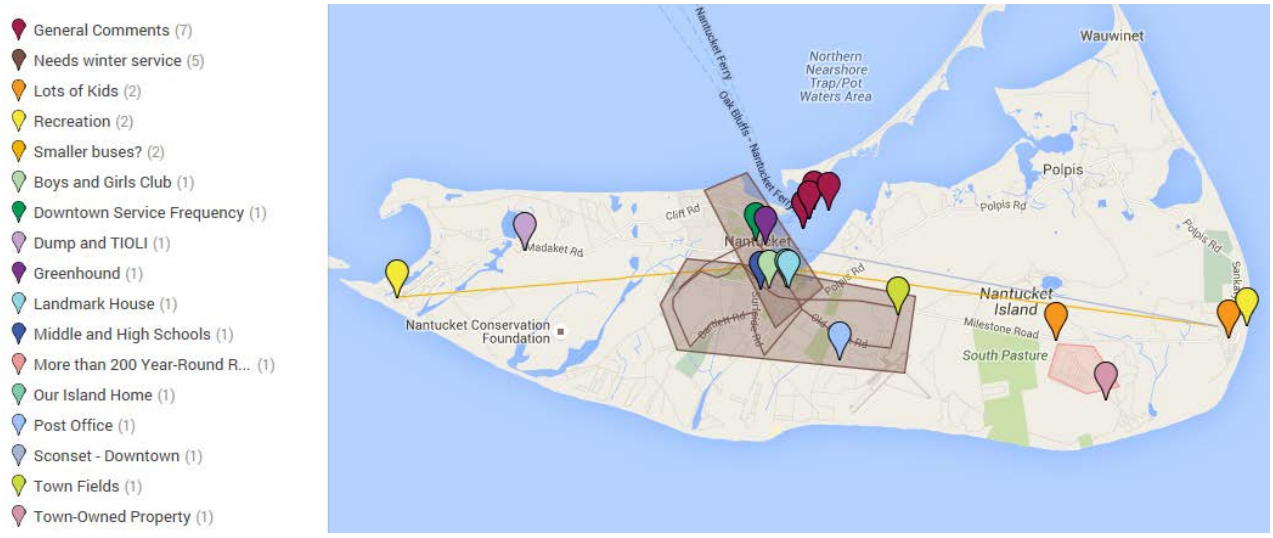


Figure 7: Daytime Workshop "Planner for a Day" Map

Pop-up Tables

Pop-up tables were set up at the High School and Stop & Shop on Sparks Avenue. The High School Pop-up table was set up in the main hallway in order to capture students as the day ended. The table included a map of Nantucket for students to draw on and indicate connections and the study goals and objectives board. Flyers about the study, with information on how to access the survey, were handed out to students as they walked by. Paper copies of the survey were available at the table for students to fill out immediately and 54 paper surveys were completed.

A pop-up table was placed inside Stop & Shop near the main entrance/floral department. As patrons entered they were asked if they had filled out the survey yet and if not if would they like to complete one. Responses ranged from "I have already filled it out", "no," "yes," and "I would but I do not have time now." For those who did not have time, a flyer was handed out with information about the study and how to complete the survey on-line. A total of 27 paper surveys were collected at the Stop & Shop pop-up table.

Surveys

As part of the Year-Round Fixed Route Transit Study, AECOM surveyed current and potential bus users. The goal of this survey was to learn more about Nantucket's demand for year-round bus service. The survey covered the period from December 21, 2015 to January 17, 2016. The following is an analysis of the survey results for the entire duration of the survey.

Methodology

Survey Development and Publication

The survey questions were prepared in consultation with the PAC. This process began in late November 2015. The survey asked questions about residency, origin, bus usage, destinations, travel frequency, and travel times. The survey was provided in both English and Spanish.

The survey was conducted by distributing paper copies to stakeholder groups, holding public workshops, having pop-up tables at key locations, as well as a robust campaign to encourage people to complete the online version, produced using Survey Monkey. The data from both collection methods was combined into a single data set. A mailer was sent to every registered business and residential address on Nantucket with a smart phone scan-able QR code and a link to the online survey. Targeted email blasts were sent to a large and diverse group of stakeholders with links to the survey. Flyers were posted around town in English and Spanish in key locations. In addition, the link to the online survey was posted on the town website, the ReMain website, The NRTA website, social media and widely "shared" and "liked" by other organizations' Facebook pages and Twitter. Finally, word-of-mouth was employed as NRTA Project Advisory Committee members spoke with various groups from Nantucket in their day-to-day business and encouraged everyone to take the survey.

Online Survey

The online survey opened on December 21, 2015 and was available through January 17, 2016. The survey was open to all individuals who live on, work, or visit Nantucket regardless of current bus usage. Individuals who use the NRTA WAVE bus service in the summer were asked how often and when they would use the service in the off season if year-round service was offered. For those that said they do not currently use the NRTA WAVE bus service, they were asked why and if they would be more inclined to

use it if it operated year-round. Individuals that responded yes where asked where they would like the NRTA WAVE bus to go.

Incentive

Survey participants were given the option of entering a raffle for a $25 Amazon® gift card. Following the close of the online survey, the names of individuals who entered were listed in Excel in the order in which their survey response was received. Each name that entered contact information was then numbered from one to 506 (the number of raffle entries). The random number generator in Excel was run twice to identify a winning number. The individual associated with this number was contacted for their mailing address on January 26, 2016.

Responses

The survey received 1,132 responses[4]. Of these, 918 were online and 214 paper versions: 75 from the Interactive Workshops, 54 from the school pop-up table, 27 from the Stop & Shop pop-up table and 58 collected from stakeholder groups. According to the latest census data (2014 American Community Survey) the population of Nantucket is 10,856. Therefore, in order to have a statistically significant data set, 384 respondents were needed[5]. Well over 384 surveys were completed and the actual number of completed surveys (1,132) represents a 2.9% Margin of Error. Of the responses, 4% were in Spanish and the remaining 96% in English.

Question 1 – Which category describes you best?

The largest group of respondents (84%) was year-round island residents, 8.8% of the island residents responded to the survey. The next largest respondent group was seasonal residents. The smallest respondent group included those who work on Nantucket but live elsewhere and must commute to the island by ferry or airplane. Three percent of individuals responded "Other." Many of the "Other" response comments could be categorized as "Seasonal Resident" or "Visitor to Nantucket" but there were a number of responses who were college students home for winter break, or individuals who use to live on Nantucket.

[4] It should be noted that not all respondents answered all of the survey questions. As such, the percentages in all figures are based on the number of responses received for that question rather than on the total number of responses.

[5] A confidence interval of 95% and a Margin of error of 5% or less.

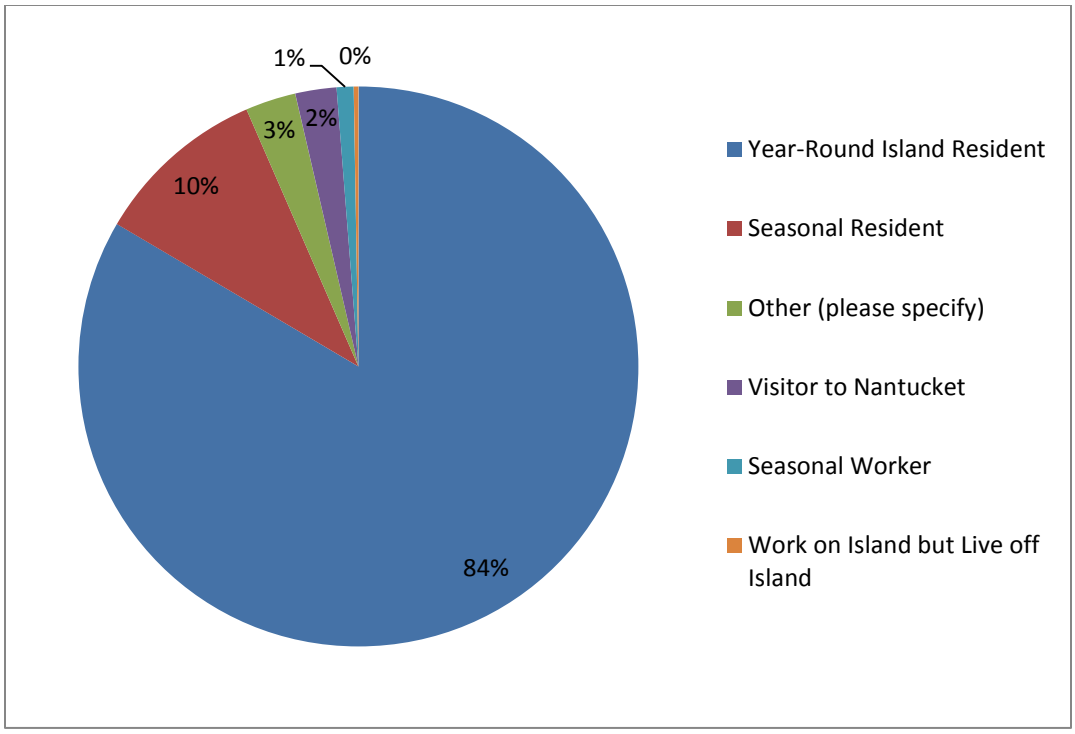


Figure 8: Survey Respondent Type

Question 2 – Where on Nantucket do you live?

Island residents live mostly in the Mid Island Area

Visitors want to go to Madaket

Seasonal residents are in Madaket

Overall, the greatest percentage of respondents (38.5%), live in the mid-island area and the least along Polpis Road (2.6%). Year-round residents reported living mostly in the mid-island area (43.2%), followed by "Other" (11.9%) and the Miacomet/Cisco Area (11.2%). For year-round residents that answered "Other" and supplied a comment, 24 indicated Surfside and 58 indicated Tom Nevers. See Figure 9 for a chart of residence location by respondent type. Visitors to Nantucket and seasonal residents overwhelmingly reside in Madaket; comments at the end of the survey indicated that some of these individuals visit year-round. Figure 10 provides a map showing where respondents live; the majority of people (66%) are located in the center of Nantucket at Mid Island/Miacomet/Downtown/Old South Rd areas.

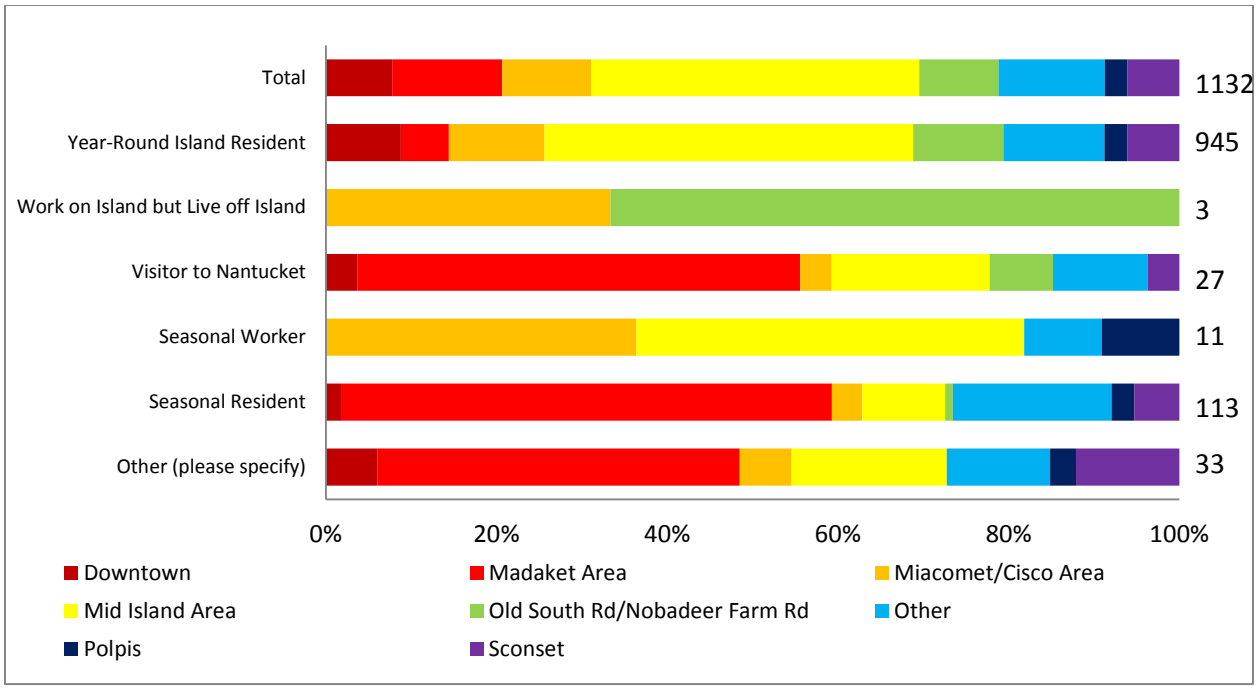
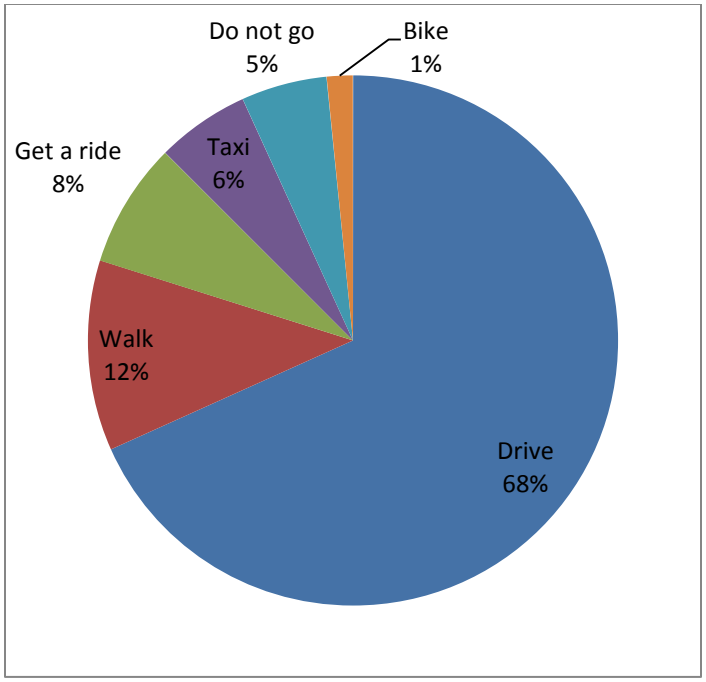


Figure 9: Residential Location by Respondent Type

Figure 10: Residence Location

Question 3 – In the winter how do you get around Nantucket?

In the off season when the NRTA WAVE does not operate fixed route service, 68% of respondents drive[6] and the remainder must find alternate modes or not make their trip. Thus, 32% of respondents are considered transit dependent. The greatest alternative mode is to walk (12%) and the least is to bike (1%). Five-percent decide to not make a trip; many of these responses correlate to visitors and seasonal residents. Eight percent must get a ride from someone else and of those 86 respondents, 30 were paper versions of the survey collected at the school pop-up table. Taxi use represented 6% of respondents.



In the winter 32% of respondents do not have a private car to get around

Figure 11: Winter Mode of Travel

Question 4 – Do you use the NRTA WAVE bus service?

More respondents (79%) use the NRTA WAVE bus service when it operates than those who do not (21%), this is extremely important. This ratio is consistent (within 3 percentage points) throughout the respondent categories year-round resident, visitor to Nantucket, and "Other." One-hundred percent of seasonal workers reported using the NRTA WAVE bus service as did those who work on Nantucket but do not live there. Seasonal residents showed a higher percentage (85%) that use the NRTA WAVE bus service. Those that live downtown, along Polpis Road, or responded "Other" are less likely to use the NRTA WAVE bus service when it operates.

79% of respondents use the WAVE in the summer

[6] This includes those who do not use the NRTA WAVE buses in the summer. Accounting only for current bus riders, 62% drive in the winter and the rest find alternative modes.

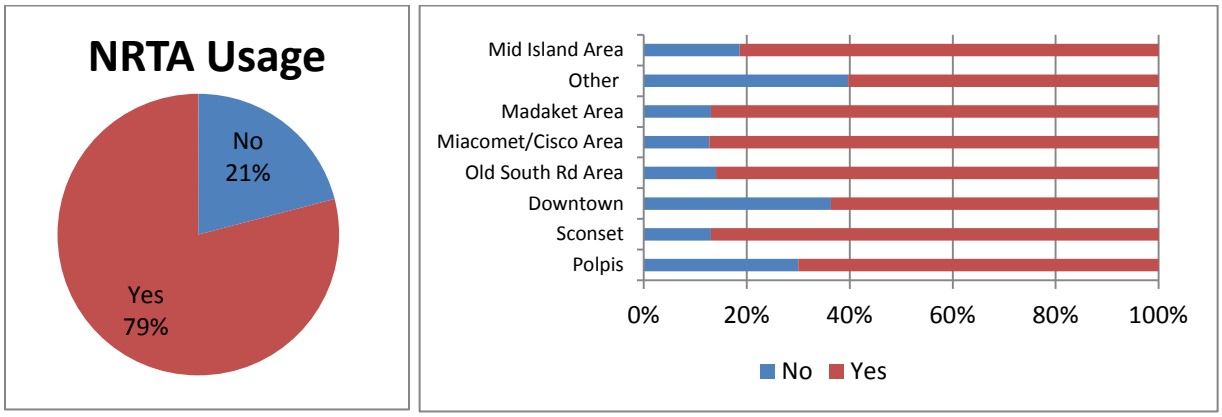
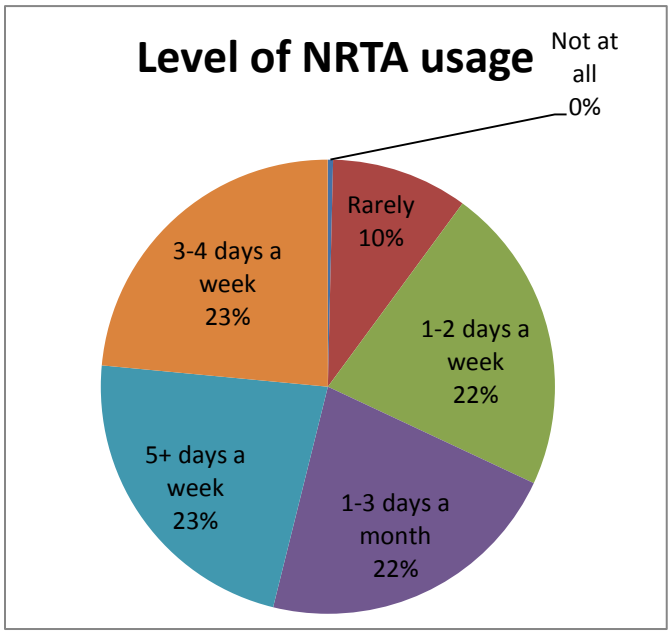


Figure 12: Overall Usage of the NRTA Bus Service

Question 5 – How often do you use the NRTA WAVE in the Summer?

For respondents that use the NRTA WAVE bus service in the summer, the responses were evenly distributed between 1-3 days a month to 5+ days a week (see Figure 13). Overall, 90% of those who use the NRTA WAVE in the summer use it at least once a month and 68% use it at least once a week. A few (3) individuals stated that they do use the bus in Question 4 but when asked how often they selected not at all. Over 50% of those that responded living in Mid Island/Miacomet/Old South Rd areas and use the NRTA WAVE take the bus at least three times a week.



90% of WAVE users take at least one trip a month

68% of WAVE users take at least one trip a week

50% of those living in Mid Island/Miacomet/Old South Rd take the bus 3+ times a week

Figure 13: Level of NRTA Usage in the Summer

Question 6 – Which routes would you use during the winter months and how often?

Individuals were asked which routes they would use and how often if NRTA WAVE was available in the off season; Table 1 summarizes the results. The Sconset via Polpis Road Route would have the least

amount of riders, as over 60% indicated they would never use the route (Figure 14). The route that would be used the most is the Mid Island Loop, 60% said they would use it at least once a month and 11.5% said they would use it five or more days a week. Ninety-six percent of those that use the NRTA in the summer would use it at least once in the off season; only 27 individuals indicated they would only use it in the summer. Eighty-nine percent would use at least one route once a month, 53.7% at least once a week and 22.9% would use a route 5 or more times a week

Table 1: Level of Route Usage for Off Season Service

Usage	Miacomet Loop	Mid Island Loop	Sconset via Old South Rd	Madaket Route	Sconset via Milestone Rd	Airport Route	Sconset via Polpis Rd	Ferry Connector
Never	288	193	351	379	391	262	471	251
Rarely	157	121	170	185	166	203	176	218
1-3 days a month	124	153	110	93	101	168	68	209
1-2 days a week	77	115	57	54	62	55	31	47
3-4 days a week	60	106	47	31	32	47	9	24
5+ days	72	90	43	36	26	43	23	29

96% that use the NRTA in the summer would in the winter

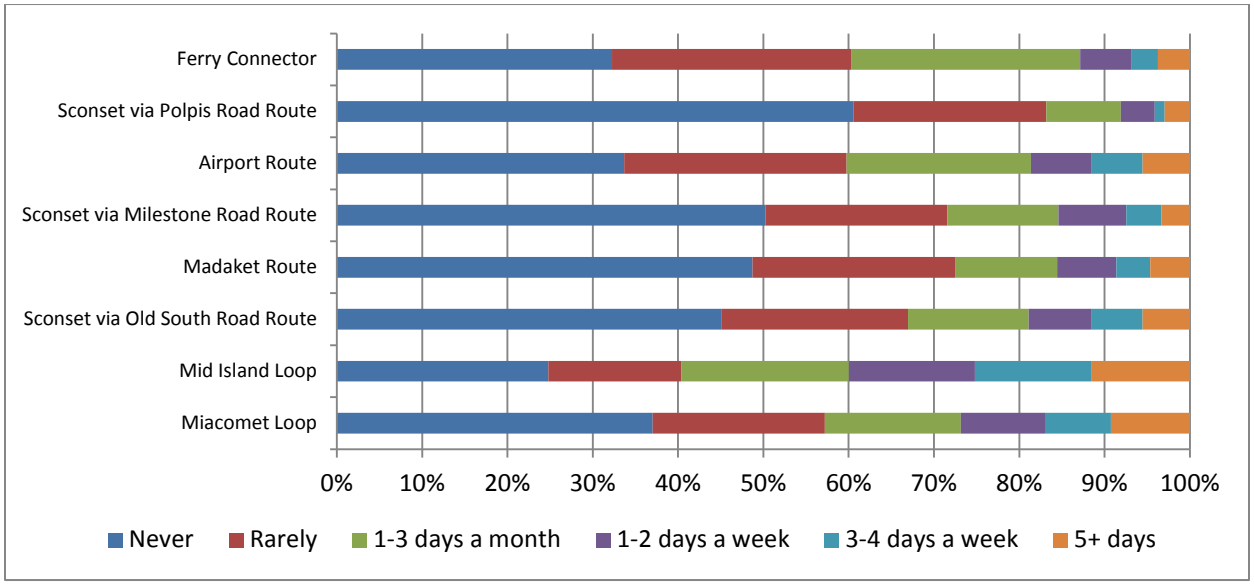


Figure 14: Comparison of Potential Route Usage in the Winter

Question 7 – What time of day would you use the bus in the winter?

For this question respondents were able to select more than one answer. The most frequently requested travel times were during the morning and afternoon commutes. The mid-day and evening service had over 300 requests for service. Early morning had the least request for service. Those that

selected early morning service or late night service correlated to those that said they would use the Miacomet Loop, Mid Island Loop or Ferry Connector at least once a month.

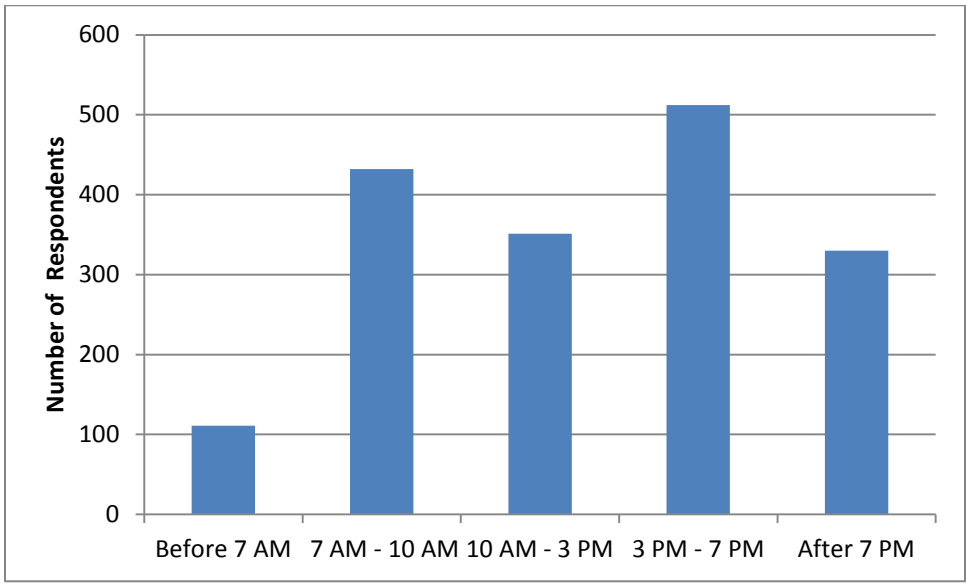


Figure 15: Winter Bus Usage by Time of Day

Question 8 – Why don't you use the NRTA WAVE?

For those that do not use the NRTA WAVE bus service, the largest reason why was "Other" followed by it doesn't operate year-round, very few indicated because the fare was too high. In the other category some survey respondents used the opportunity to select multiple responses since the question was limited to one answer. Overwhelmingly, however, most people commented that they prefer to drive as the reason to not use NRTA WAVE.

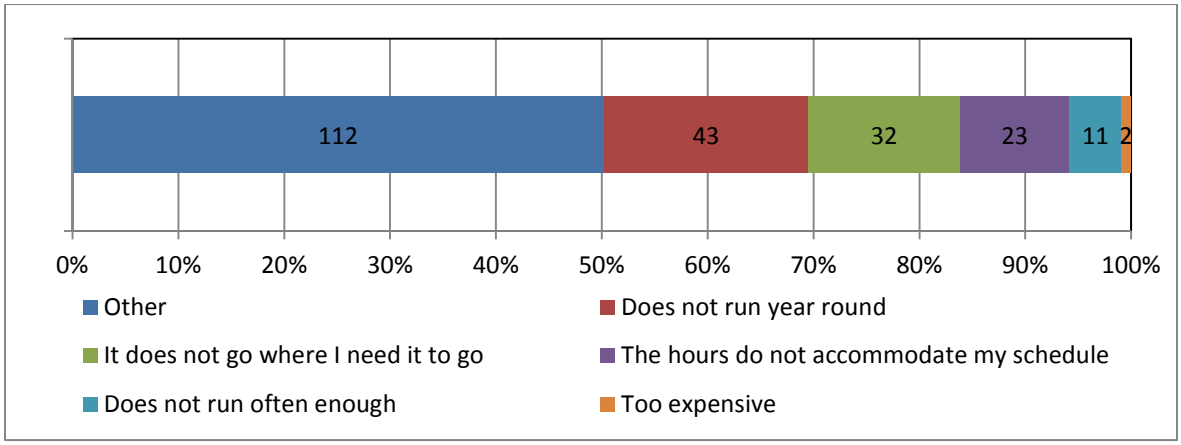


Figure 16: Why Individuals Do Not Use the NRTA WAVE

Question 9 – If there was year-round service would you be more inclined to ride the bus?

Forty-seven percent of those individuals who do not currently use the NRTA WAVE bus service said they would be more inclined to use it if the service ran year-round. Those that responded yes lived largely (31%) in the Mid Island area or "Other" (41% of the others said Tom Nevers).

Mid Island and Tom Nevers residents are more likely to start using the bus if year round service was implemented

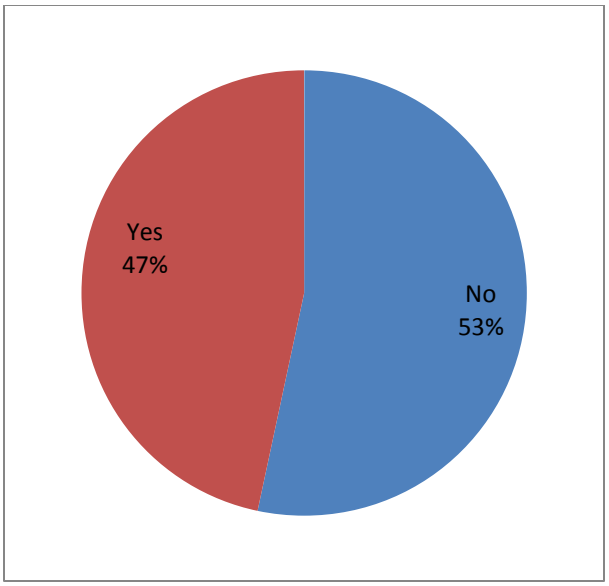


Figure 17: Those That Would Start Using the Bus if it Ran Year-Round

Question 10 – Where would you want the bus to go?

For this question respondents were able to select more than one answer; this question was only open to those who do not currently use the NRTA WAVE bus service but would if it ran year-round. The most requested place was the ferry terminals followed by the airport and Mid Island. Forty individuals selected "Other". The most common "Other" comments were downtown, the hospital and Stop and Shop.

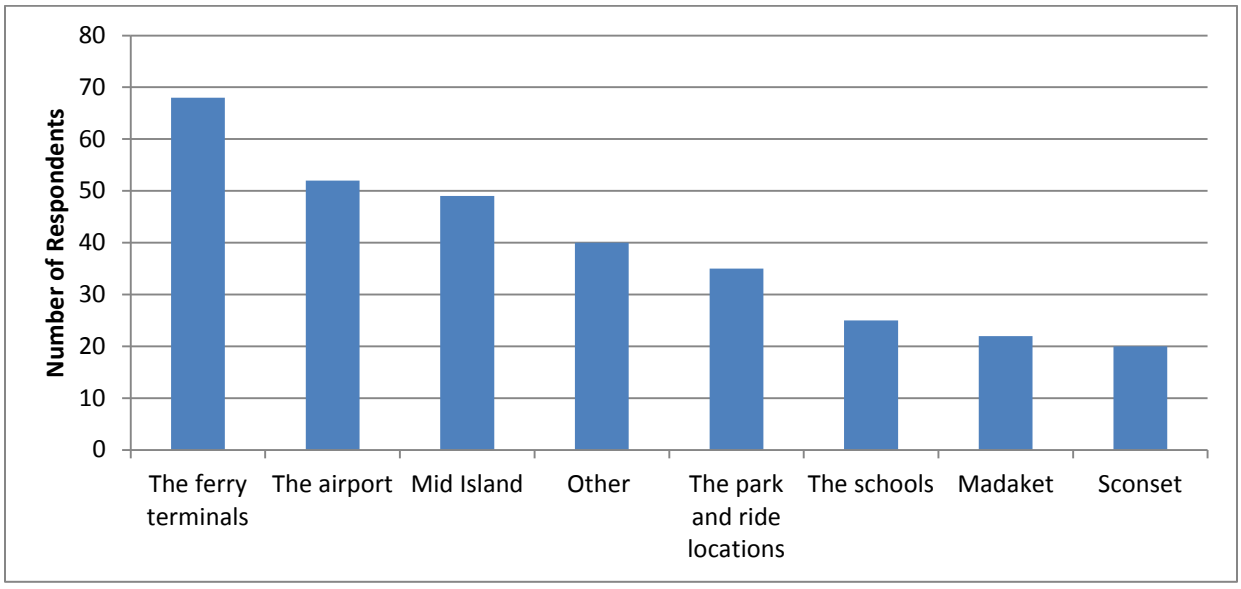


Figure 18: Where Individuals Who Do Not Currently Use the Bus but Would if it Ran Year-Round Would Want To Go.

Question 11 – Other Comments

"A year round bus system would be extremely useful for tons of year rounders"

Three-hundred and twenty-four individuals (28.6% of all survey respondents) left comments and overwhelmingly most were positive. Positive comments ranged from people encouraging and wanting year-round service, citing the criticalness of public transportation, to those that may not use it but understand the need for it. A few individuals even stated that they had a car but if there was year-round service available they would use the bus instead. Parents commented that they would love to have it for their children to use and a few students said they would use it for after-school activities. Some comments cited that even if it was not financially possible, they would like to see shoulder service extended from the Daffodil Festival through Christmas Stroll at the very least. There were roughly 20 comments that were not related to the survey but either comments on summer service or requests to serve areas not currently served during the summer months (such as Tom Nevers). Thirty negative comments were provided (9.3%), most of these felt that there is not a need for year-round bus service, it would negatively impact the taxi drivers or they did not want to fund it. Overall, however, comments were positive and individuals would like to see the bus service operate year-round.

"I would definitely use a year-round bus service"

"If we had a Year round bus system I would use it all the time instead of using my car"

Conclusion

Overall there is support for year-round bus service and the survey results and outreach effort show that it would be utilized. Eighty-five percent of the respondents said they would take the bus during the off season[7]. The areas with the highest demand for service based on the survey and outreach results are: Mid Island, Madaket and along Old South Rd. There is also moderate demand out to Sconset and Madaket based on survey and outreach results.

86% of all respondents would use the NRTA in the off season

[7] This includes those that do not currently use it but would be more inclined to use it if it ran year-round.

Appendix: Other Responses

The appendix includes "Other" responses and comments directly from surveys, responses have not been altered. Comments received in Spanish were translated into English using Google translate.

Question 1 - Which category describes you best?

Other Comments
Student
8 mo / yr
Student
Student
Student Intern
College Student
College Student
Home owner and seasonal resident (we go more than the season with the house)
Spend about six to seven months on the island with plans to increase that
Time Share: June, August, December, February
former Resident with property on island
spend 2 weeks in each season, winter, spring, summer, fall
Year round part time resident
Yearly Resort timeshare
property owner who rents to Nantucket working people
Here all year but stay on mainland off and on.
We are 4-month residents but intend to increase time in the next few years when we retire
Year Round Visitor/Homeowner
6 month resident
My family has a total of shares (totalling 8 weeks covering all the seasons) down in Madaket.
home owner and frequent visitor
Intermittent year round resident
weekends and six weeks a year
Live in Madaket 4 months/year All shoulder season
I own multiple timeshare weeks at Tristrams and Brant Point
lives on island 4 days biweekly and all summer
Work in Town
Seasonal worker Spring, summer, and fall
Parents lives on the island
Had to move off island, lack of (affordable) public transportation was one of the main reasons as a young single mother
We mainly are there in summer but out at least one weekend in other months
Previous resident and now frequent visitor

Question 2 - Where on Nantucket do you live?

Other Comments
by the airport
11B Boynton LN Nantucket
Tom Nevers
Tom Nevers
Tom Nevers
Tom Nevers
Tom nevers
Tom Nevers
Tom Nevers
Tom Nevers
Tom Nevers
Tom Nevers
5 corners
5 Corners
5 corners
Airport area
airport area
Airport area
Bartlett RD.
by Crooked Lane at Madaket Road stop
Cisco
Cisco
Ciso
Ciso
Cliff
cliff
dionis
Dukes + Madaket
East of rotary
Hoicks Hollow Road -east shore
homes in sconset and town
Landmark House
Landmark House
Madaket Rd at Maxcy Pond
Milestone Road
Milestone Road
Monomoy
Naushop
off island
off Milestone, between Rotary and Nobadeer Farm Road
Old Mill

one mile from town.....out Cliff Rd
Pocomo
Quidnet
South Shore
South shore
South Shore Rd
South Shore Road
South shore road
Sparks Ave
Sparks Ave
Surf side, Nobadeer
Surfside
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Surfside
Surfside
surfside
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Surfside
Surfside/South Shore
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tom nevers
Tom Nevers
Tom Nevers
Tom Nevers
Tom Nevers
Tom Nevers
Tom Nevers
Tom Nevers - why was this not a choice???
Tom Nevers East
Tomnevers
Town
VESPER/HUMMOCK POND RD., PROSPECT
Wauwinet
West if town
West of town
West of town. Madaket Rd
Airport area
Hussey Farm
Landmark House

Surfside / S. Shore Rd
Tom Nevers
Tom Nevers
airport
Occasional visitor from CT
Old South Rd
Tom Nevers
Town
Surfside
Usually visit by boat

Question 8 - Why don't you use the NRTA WAVE?

Other Comments
No passes often enough ; No passes all year
No need
I like to walk & ride a bike; the buses are too noisy & too large; I support local cab drivers; not a fan or a patron
No Interest
It does not go where I need it to go; Does not run year round
takes too long and I want my car when I'm grocery shopping
I can easily walk or drive anywhere I need to go on island.
If I need to go downtown and to work,I walk. If I need to go to Stop & shop I go out of town and drive.
Just does not fit my schedule
Walk or drive
I have a car, bike and feet.
I walk to places due to proximity of where I live to town. Do use it to get to beach sometimes and the ferry service
Have car
Not a public transportation user.
have not investigated the services provided, may use in the future
Have car
Easier to drive
Have auto
Prefer to drive
route is not convenient for me
Still Driving
CAR
I bike in the summertime when it runs.
Rude/unsafe drivers and too much town funding
Have to transport kids daily
own a car
No stop that close to my house, I would use it to go downtown, but I don't go down there too often in the summer
I like my car

Drive everywhere
Not close to where I might have to go
Drive a car
3 minutes to drive to work, 15 to take the bus
Have been here 40 years and drive.
I don't need to
I get motion sick on mass transit.
inconvenient at best - annoying at worst
Too Slow
faster by car
don't need to
Not familiar with routes
Dirty and drivers feel unsafe
not needed
Working
not sure how to use it.
Timing and length of time. Car is easier, or walking or biking.
I have three small children and haven't been brave enough to take all three with me on the bus
own a car
Not route specific/timely for errands at work
There are better ways to get around
I'm retired now and can design much of my life to avoid high traffic times and I own a car
I just don't need too
Too far from my house
I have a car
No need
I don't need it
I don't like waiting for it.
I drive and there are no stops near me.
Your Drivers
Not early enough have to be to work at 7am
The bus stop area has no sidewalk and is on a busy road.
Do not need to
I'm fortunate to own a car and use it because it's more convenient.
Waste of taxpayer funds every year ,needs to turn a profit or cease to run
reckless driving/ smell terrible
Does not run often enough; The hours do not accommodate my schedule
I should, but when I need to go somewhere I just don't think of it. I'm glad it exists here though.
Drive for Convenience
I still drive.
Own a car
Because it takes away from the many year round taxi companies that provide a valued service to our island
I have a car so as I take my kids around the car is easier.

Stop is to far away- would use if closer
no need
my CAR
Too inconvenient to walk with parcels to/from my stop I can never remember the Polpis Road schedule.
previously we have not been here in season
Have Car
have a car
I only drive w/ my dogs
Am a Senior, easier to use car....not convenient for me to get to bus.
[left blank]
We need it to go down the Boulevarde. Then, many of us would use it.
greatly prefer private transportation
Driving is easier at my age (77); don't go into town during summer.
I don't want to ride a bus
inconvenient
Too far to walk to get to bus stop
I have a car.
Is not accessible to Tom Nevers resident. WOuld have to walk a mile just to get to the stop on Milestone Road.
not close enough to my house
Use it occasionally in summer, as needed; still independent and driving for the most part though.
prefer to drive myself
More convenient to drive.
Not on my route
I have a car
Need to use truck for work
I get a ride from neighbors
Does not run often enough; Does not run year round; Not at my street
No schedule; no way to know when the bus will come
It does not go where I need it to go; Does not run often enough; Does not run year round
Don't like it
have not lived here long enough to experience
I drive
Does not run year round; The hours do not accommodate my schedule
Generally need my own vehicle for work. Travel frequently between jobsites.

Question 10 - Where would you want the bus to go?

Other Comments
Hospital - Stop and Shop
all of the above
Anything out Orange St. from Downtown
Boulevarde, Okarwa, Skyline
Cisco area, brewery and farm area
CISCO BREWERY

Down Tom Nevers Road
Down tom Nevers road
Down town
Downtown
Downtown
Downtown
downtown
Downtown
Downtown
Downtown
Downtown
Downtown
Downtown; stores (big Stop & Shop, Marine Home)
Everywhere
Hospital
It will be great to have it.
It will be necessary
Main Street
many people would benefit from public transport . We need it .
my stop at Crooked Lane and Madaket Road
not everyone is rich
Park overnight and ride to airport or boats
Please, we need a bus service year-round. There are a lot of people that have no means of transportation, even to go to the supermarket. Nantucket needs a year-round bus.
Polpis
Stop and shop
Stop and shop, downtown
the Hospital
Tom Nevers
Tom Nevers badly needs service, lots of year round residents
town
Wauwinet
Work

Question 11 - Other Comments.

Other Comments
A friend of mine who cannot drive anymore would really love to have a year round NRTA service.
A year round bus system would be extremely useful for tons of year rounders.
A year round service would be great. There are far too many people left walking out in the cold or forced to pay for expensive cabs. I miss the ferry connector in the off-season. I park in town and worry about being towed or ticketed or have to get a ride.
Already too much traffic as is, Just keep the craziness for seasonal only please. Never need it then, Why need it now.
although I do not use the NRTA I am a strong supporter of the idea of year rnd service.

Am so happy that the bus is and will run year round thank u.
As a seasonal homeowner I might visit more from late Fall to early Spring with a bus. I may also consider winter rental if a bus.
As a seasonal resident I think that there should be service from the Dafodil Festival through Christmas Stroll. My family and I use the bus most often on holiday weekends, and August weekends because of parking problems. Hourly service after Labor day weekend would be sufficient.
As everyone knows, Nantucket is changing. As our year-round population increases, affordable public transportation will be critical to the smart growth of the island.
As long as I can drive no need. But in a few years I'll be so grateful, particurly if it runs in winter.
As the "season" seems to go later and start earlier each year possibly running some service at least till Oct and starting earlier in the spring to Madaket would be very beneficial. Love the service. Thanx for your efforts .
As yrrd for 40 years I see a deep need to provide yr round to our large immigrant workforce that we rely on. Dependable service that allows not only getting to work but shopping etc. It is enlightened community interest for all to provide this service which needs to be very affordable and dependable.
Being in the transportation industry on Nantucket I feel there may be better options available other than the NRTA
Bring them back for the winter there are people who really need transportation in the winter time and they can afford even a taxi
Bus isn't needed in the winter. Everyone can get around just fine with private transport and this will be a massive money loser.
Buses for workers are necessary.
Cisco beach is the only public beach with no shuttle service. this would be a huge benefit and also address the need for more parking at the public lot
Current buses are too big + too noisy for our little downtown streets & neighborhoods. Need a smaller quieter bus
Do it.
Don't need this. How else can we lower Nantucket? Affordable housing, $1 rides...not fair to taxi companies.
Don't think necessary to have year round service. No commerce out there in winter. Just residences
DON'T WANT IT. ITS JUST ANOTHER PART OF THE URBANIZATION ON NANTUCKET!!!
Drivers tend to speed. Almost fell out of my seat a few times. Sometimes they forget to turn on the stop cords for when people want to signal that they are getting off.
Due to the lack of parking at the SSA, An early shuttle (6AM) from the fast ferry connector lot to the early SSA slow boat and a return shuttle meeting the last ferry arrival (10:15 pm) would be helpful for those people that do not ride the fast ferry.
Employs a year round retiree. Keeps walkers warm & safe. Less DUI's Hospital Bus Route Yearly
Even I winter service is not restored, the Madaket route should be kept open a lot longer in the fall and early spring.
Even if not year round, I would love to see the Madaket loop run beyond the peak summer season - perhaps April to October? Thanks!
Even though I am currently an occasional user I have 4 children who are more frequent riders and we LOVE the Wave. I think that we all would try to use the bus more of it is available year round. Thanks for trying! !
Extending service to Madaket through the fall would be nice.
Few routes during winter would be a great help to people like myself who works on the island year round.
Go year round!
Good job with NRTA
Great aniciativ for year-around residents. Great if runs until 11 PM ferry terminal
great for seniors of Madaket
GREAT IDEA
GREAT IDEA

Great idea but I am not sure how much I would use it - perhaps my 2 children would - . Raise the rates for monthly passes - they are ridiculously cheap for the service offered. Cover your expenses more.
Great idea for year round & even if it's till stroll.
Great idea if it could be financially viable
Great idea! Trials would be worth while.
great idea.
Great idea. It would help slot. Even if it runs through the Christmas Stroll
Has the Nantucket Taxi Association been consulted about the impact the NRTA may have? Overall I am for it as long as it is state funded.
Have the bus go down EEL Point in the summer to Dionis Beach
Having the WAVE active year round would make transport easier for many people.
Having year-round bus service would be incredibly helpful for medical appointments, community events, and access to supplies for those of us who do not have any transportation options.
Hope this works!
Huge compliments to NRTA for its' summer efforts and effective accommodation of so many!!!
I ♥ the wave
I ♥ The wave
I also think that there should be buses going in both directions. And maybe more frequently
I am a disabled, middle-aged native on a fixed income and this service would be of tremendous value to me and several friends who wont fill out a survey because they either dont have access to the internet, or they just dont vote, if you know what I mean.
I am completing this survey not so much for ourselves but for those people we know who are dependent on WAVE for existence in Sconset.
i am fortunate that I can walk to the ferry year round. Otherwise I might use the ferry connector
I am not a typical rider, but as the demographics of our work force change I see year round service as a vital part of our social infrastructure.
I am opposed to any expansion of the bus service.
I am unable to use the Wave due to my need to travel for my job. I am aware of people who rely on it in the summer to reach their job destinations who loose their transportation and ability to mantain their jobs.
I believe bus service is vital to the safe travel, as well as being a viable wayto work for year rounders, as long as it is affordable. Workers should be given the opportunity to purchase commuter books at reduced rates.
I believe many of the current summer routes are costing more than they are bringing in. I don't believe that a year round bus service could possibly pay for itself. For this reason alone along with other reasons a year round bus route doesn't make sense. Also, the summer bus routes cause more traffic than they eliminate. Every time the buses stop traffic piles up behind them. This is not helping the existing traffic problem caused by having too many cars on the island.
I believe that year round transportation is essential as the traffic is very congested and there are many people who need this service. I try not to use my car whenever possible and would surely use the Wave if it were here year round.
I definitely believe that there is not only a need/desire for a few key buses, but most definitely a market to capitalize on
I do drive but when the time is not too cold I would ride the bus sometimes during the winter months.
I do hope that it is found that Nantucket could sustain a year round bus service.
I do not think there would be enough demand to justify the costs.
I do not use the shuttle often, as I walk or bike in summer month, but use it on rainy days, etc to get to town. I think there is a need for year round service at least in the mid island/ Miacomet area.
I do not want to see the bus service run year round. It is a problem enough in the summer with traffic. The stops need to have an area to completely pull off the road as to not interrupt the flow of traffic.

I don't feel the NRTA is necessary year round
I don't feel there is enough of a need for year round service for the bus. I don't think people will stand outside, in the cold, waiting for a bus.
I don't ride the bus - BUT - I think it is a GREAT IDEA to have year round bus service
I don't think there is enough need for year round service & it would hurt the year round taxi drivers who already essentially donate a portion of their service doing lots of senior fares at $4 with a lot of personal care for their regular riders
I don't want my tax dollars wasted on this service.
I enjoy off season and when buses are gone.
I feel that it would be great for year round island residents to have a bus service line that runs throughout the whole year. It is hard for people to get around and go to work or do everyday errands with no car. We end up spending the money we make just to get to work or don't work at all and the winter months become a struggle to make ends meet. Offering this service would allow those who do not drive a way to work and make an income.
I feel that with the present year round transportation services in place, taxis, Your Island Ride ect...we can meet the lesser demand for service in the Winter and may possibly offer such things through the taxis as car pools, ride sharing and senior and disabled discounts we have other options than the NRTA Buses.
I feel that year round service would not only benefit the people but also NRTA WAVE
I filled this out for my 19 yo daughter. I also have 3 other children that would also use this service
I have found this summer it's was so easy to get to work every day and the people were always friendly bus driver where pleasant and I Thank you for doing it.
I have friends who would DEFINITELY use a year round bus.
I have many friends who need this desperately who cannot drive, have small children and have real trouble getting around in the bad weather months.
I hope the NRTA implements year-round service!
I hope they can find a way to make this work - for people who don't have cars - for workm the grocery store, Doctors appointments. Speaking of - why don't you have a stop on the hospital Campus? And should the NEW hospital campus include planning for WAVE stop?? I think it should!!!!
I hope this can work out!
I hope this year-round service bus does happen! Even though, there arent much tourist here during the winter season it's still a great way to commute around the beautiful Nantucket!
I inquired about this a decade ago & have been asking ever since on a regular basis. Please do!!!
I live close to the store, USPS and bank and have year round housing. But a lot of people find seasonal housing out of town and need the bus, especially those who cannot afford reliable cars. This service is awesome and should be available year round.
I live year-round in Sconset, and am a senior citizen. In the summer, I leave my car at home, and rely almost completely on the bus to go to/fro town. Of course, I would love to see year-round service to Sconset, but I doubt that there would be enough winter riders to warrant bus service, but Tom Nevers might. If that were to happen, I might make use of it.
I love the ferry connector service and would be happy to have it run year-round!
I personally would not ride the WAVE, but I have many friends who would and desperately could use a year-round bus service.
I personally wouldn't use it but I think it would be a FANTASTIC idea for locals/year round residents and workers! It would give me jobs and help people get around more effectively.... You wouldn't even need a full schedule just do 2-3 morning routes (8, 9, and 10 am) and 2 or 3 night routes (5,6,7) for most if not all of the workers and I guess one late night last bus. I know it would help out so many people
I really hope there is bus service year round, even if it is a scaled back service. I would like to see the Madaket Route, Sconset via Old South Road Route, Mid Island/Miacomet Loop in service year round. I have a lot of trouble seeing in the dark and a bus would be very helpful once the days start getting shorter. Even though some year round residents own cars, many have a lot of trouble driving in inclement weather. I think a year

round bus would really help our year round economy. When people show up for Christmas Stroll/New Year's Eve/Daffy there is no way to get around. Martha's Vineyard has a year round bus service--has the NRTA approached them and asked how they make it work? There must be federal or state subsidies available for transit programs.
I really would love for the WAVE NRTA YEAR -BUS SERVICE cause it would be more inexpensive for my pocket .
i see lots of people walking in the dead of winter..this would be so beneficial to them
I take the bus regularly...efficient,easy and a winter route would be incedible!
I think a few buses a day would help all year round residents
I think all route stops need to be revisited and discussed with homeowners when benches, shelters (like at The Muse) are installed. Those who own property where stops/pickups are designated deserve some sort of say in this matter, for the best interest of both parties.
I think is would be good for the working people. MV has theirs year round. Maybe have service 7am--1 pm 3pm-7pm . People that shop, do errands, keeps traffic flowing down town and more parking for people that have to use their vehicles
I think it is important for daily workers who have no car.
I think it would be a great addition to the island to have a year round bus service.
I think it would be a great service.
I think it would be good to extend the current service beyond the current seasonal time frames so people can enjoy the island more.
I think it would be great to have year round service even if I personally don't use it - I think many others would.
I think it's a great idea to offer year-round buys service for people who do not drive. The winter months is very difficult for people who can't drive due to many reasons and circumstances.
I think the wave should operate year-round. a little money is better than no money at all.
I think there are many people who could use the service year-round, obviously not to all locations and not as frequently, but I do think it is an important service that would be well utilized.
I think there is a definite need for this on the island. Maybe not as frequent as the summer schedule but there is a need.
I think they shouls run limited routes in the winter in the more populated areas especially to and from the Steamship and Hyline docks.
I think this is a great idea & would not only help those without cars but provide jobs for a few year round folks.
I think this is something the island definitely needs. When it snows, the bike paths are usually unusable, making travel difficult and unsafe for those on bikes or walking to work, as well as for those relying on mopeds.
I THINK THIS SHOULD TOTALLY HAPPEN! IT WOUILD BENEFIT SO MANY PEOPLE. THANKS FOR CONSIDERING THIS IDEA!
I think this would be great for the miacomet and mid island loop
I think this would be so beneficial for island workers- guys on my crew ride their bikes to the job site every day, even in the snow! I also think it would prevent DUI's!
i think year round service is a great idea, please make it happen!
I think year round service, even if limited, would be essential to year round residents. It's difficult, if not impossible for some to do even the bare necessities during the winter minths. I.e. Grocery shopping, bank runs, going to work, etc.
I think you should offer year-round bus service because although I don't use the bus that often I know a lot of people who could use it in the off season. I work for Bartlett's Farm and a lot of our seasonal employees do not have cars, so often have to rely on cabs or biking in the very cold weather. I think there is a demand for year-round bus service, even if it is not as regular as summer season.
I understand not wanting to make change on the bus - perhaps you sell tickets in town?
I understand the discussion. However, are there really enough riders to validate expense of year round service?
I use it from time to time in the summer because of parking problems downtown.
I use the senior bus but there are times (weekends) that I would like to ride the NRTA bus

I want bus service!
I wish i could use the Nrta before 7 Am around 6 am
I wish the bus ran to Cisco
I work for a small non-profit that helps numerous, year-round residents without transportation. I do believe that the mid island/downtown area is in desperate need of year-round bus services. People that we serve have difficulty coming to our mid island location as well as to Dr's appointments, the pharmacy, grocery store, etc (especially in bad weather).
I would absolutely love to see the NRTA available to year-rounders. Public transportation is a great resource for all communities. Nantucket needs this! Thank you!
I would appreciate bus service May through October for our family, but am completely in favor of year-round service.
I would appreciate winter service, even if less frequent than in summer.
I would definitely recommend year round because the need is there.
I would definitely use a year-round bus service.
I would like to have NRTA into a year round bus service. Sometimes I go to Nantucket in Madaket, Sconset in the winter and the Christmas strolls, etc....also most often in the weekends.
I would like to see bus service year round as I believe more people will use your service
I would probably just cab it in the winter so I wouldn't have to freeze in the wind/snow. The only time I use the wave is when I plan on going downtown to get plowed so I don't drive.
I would take it daily to work and on weekends to go out downtown to avoid parking.
I would use it on occasion to town.
I would use the bus in the winter to commute to work, like I do in the summer. I would use the Miacomet Loop in the morning and early evening to get to and from there office, and the Mid Island Loop during the middle of the day to get to and from clients. I would really love having a year round bus, because then my family could downsize from two to one car and reduce the number of cars on this island and the car pollution and traffic.
I would use the bus more often in the summer to commute to work, but connection times don't work. I live on youngs way and work at the hospital starting at 8am. I have to go to town by one bus, then take the mid island. Bus doesn't start early enough to make that happen.
i would use the shuttle to access the ferries
I wouldn't use NRTA in the winter, but would use it in the fall and spring…April, May, Sept. Oct.
I wrote a letter to the editor in the Inquirer and Mirror a couple of years ago. I would be very happy to have the year around service
I'd especially like to use the bus when there is snow on the ground as I do not own a 4 -wheel drive vehicle.
I'd much rather use a taxi company and pay more then pay less and use the wave
I'd use it more if the cost per ride proved more effective than gas for my car
If I respond that I would not use NRTA in winter, why do I have to select a time when I would use it. Silly survey format. Too cold to wait for buses.
If NRTA is to have year-round service, I think it's very important that a stop by made at Mid-Island Stop & Shop for the convenience of those w/o cars.
If the NRTA is to continue to operate there needs to be better pull-offs for the stops so that the buses do not block traffic but actually allow traffic to flow past them so they are not actually adding to the traffic problem
If this becomes available it will be very helpful to families
If we had a Year round bus system I would use it all the time instead of using my car.
I'm a student at Nantucket New School. I would use it for after-school activities
Important to have a shelter on OSR
In telluride their buses use oil from the restaurants that in turned into fuel to run the buses. I would love to see this alternative clean energy used on nantucket. And their bus is free as well. Something to look into how they are able to have a free bus service year. I also think that during the summer months the bus should run later so

that the restaurant workers can get home safely.
In the summer I use the Wave because we live in Sconset. In the winter we move in town so we walk or drive because there is no traffic or parking issues.
Instead of every 15 minute departures, one hour would be fine in the fall through spring.
it can not support it self in peak season,never mind run in offseason. No one is going to stand out in the rain,snow and wind to wait for bus. Fiscally irresponsible to spend MORE of taxpayers money on a proven waste of funds. We have a housing problem and people who need food and heating assistance more than a bus line that can't turn a profit
It is very important for working people.
It seems to me that the cost would be prohibitive. Downtown is not a destination in the winter. When I use the shuttle during the summer it is to avoid parking difficulties. Perhaps a longer shoulder season as a trial would be more appropriate. The bus should not run if it would create a financial deficit to be made up with tax dollars.
It takes away from the already lean taxi business in the off-season.
It would also be great if the bus could take students home from sports and after school events. Also.... There is a huge need for a bus to take students to the boys and girls club after school. Please also remember that the public school does not provide bus service for many of our families and we have an increasing number of people who are moving to our island without cars. Families with very young children are forced to walk their children to school - during the winter months this is an issue....
It would be a wonderful service for those who don't drive to be able to use a year round bus
It would be amazingly helpful to have the Madaket route running, perhaps less frequently (every hour?).
It would be great if at least some service to and from Madaket would continue through Columbus weekend and begin again by Memorial Day Weekend. Thank you for the questionnaire.
It would be great if we had it year round
It would be great indeed if we could have bus service around the island. It could avoid much traffic in certain hours. Tks
It would be great to have a bus to Surfside for residents that just beach goers
It would be helpful for employers trying to build year round businesses. Most of my seasonal employees cut their season after the loss of nrta because housing was not in walkable distance. It was also helpful in inclement weather.
It would be highly appreciated if NRTA was year-round. It would especially make it easier to grocery shop, go to town, etc.
It would be very helpful if the NRTAWave service was extended to provide Seasonal service along Old Tom Nevers road -would cut down auto traffic, and walker safety. Family members/grandchildren would use it more.
It would be very helpful when I have visitors because Madaket is far from town
It would be wonderful if NRTA stopped at the High School
It would be wonderful to have the bus year round. I often walk, and take taxi in foul weather, the bus would be such a great way to get around.
It would make "off-season" living easier for many!
It would really help to have a way to get to Madaket without getting a taxi in off season
It's a waste of my tax dollars and is a major cause of traffic tie ups on the island
It's a waste of time and would impact the income needed to survive the winter for more the 200 people that otherwise could end up needing public assistance. Putting a strain on a system already overloaded. Unless that's the intent.
Just because I don't use the service doesn't mean I don't think it would be useful to others.
Just because I would not use it, it might be feasible for those working folks. It would be good to avoid extra cars in town!
Just because I would not use this service, I would not want to deprive anyone who wants - or more importantly - needs it.
keep up the good work Start service before Wine Festival.

Keep up the great work!!
Let's do it!
Like to see it go down tom Nevers Road to the Naval Base.
Love NRTA. I really think even limited service would be great year round.
Love the bus, the service, and the employees are great. YEAR ROUND YEAR ROUND YEAR ROUND!!!!! Yayyyyyyyyyyyyyyyyyyyyyyyyyyyy!!!!!
Love the cleanliness + attitude of drivers.
Loved the community outreach yesterday and today. I hope some new information was given that you all can use. Having year round bus service WILL retrain people. Summertime revenue will increase because the habit of bus ridership can be created. Summertime revenue is above acceptable levels right now.....I hypothesize that adding winter service will increase net during the summer even if a deficit (most likely temporary 1-3 years) in the winter is experienced.
Madaket Route could be every 2 hours
Make the bus stops safer, where there are flat sidewalks so people don't have to stand on a busy road. I know someone who had there feet run over as they tried to just sit on a bus stop bench on Bartlet Rd. It is unsafe for elderly people, disabled people, children, and people with pets, and violates the Americans with Disabilities act.
Many year rounders including those in the workforce live in Tom Nevers. If the NRTA followed the Tom Nevers School Bus route, I bet that many might be inclined to use the NRTA which would help with traffic and congestion especially in the shoulder and high seasons. I might be wrong, but I believe more in the workforce probably live in Tom Nevers than on or off Polpis Road. There is a stop on Milestone Road but with no parking availability, and a loop through Tom Nevers might greatly increase ridership?
Mid island loop and ferry connector please
More important for some of my coworkers at hospital without cars. Also with the upcoming construction at the hospital parking will be difficult and a bus service would be very helpful.
Most of the working class could use the mid island and old south rd loops. early morning and late afternoon
Much needed service.
my busy schedule is so varied every day
My main destinations all year round are Stop & Shop, Nantucket Health Club, Cape Cod 5, some times post office (02584) and St. Paul's Church (has parking lot)
my only comment "it's time"
My situation may be unique as I live off island most of the time but work 4 consecutive days every 2 weeks at my home near the elementary school. I need to get there when I arrive on island, and back there to the boat at the end. I use a car or bike while I am here. My children use the bus every day for transportation in the summer when we live here.
My visiting fmaily uses it. Reasonable
N/A
N/A
Need for year round service
Need service on Tom nevers road
NO
No
NO COMM
No thanks, save the tax payers money.
None
Not needed off season
Note for my answer to how I get around in off season, I walk to town, but drive elsewhere. I answered "drive" to be clear that I have that transportation available to me.

Nrta has benefits of summer.. parking and getting around. I think winter it will be a tax payer expense needed by very few
NRTA PRIVIDES A MUCH NEEDED SERVICE FOR THOSE WHO DO NOT HAVE A CAR
NRTA Provides a very important resource to the Nantucket Community
NRTA should be expanded in season to include the Hummock Pond and Cisco Beach area.
NRTA WAVE [with a heart around it]
Nrta year around bus will be a plus for year around residents,and also encourage manny others to stay in the community and provide laborers so crucial on the spring summer a nd earlier fall
off season ran miacomet and same bus mid islan that would be great
On very cold days, I take taxis to and from the mid-island Stop 'n Shop -- only a mile, but the same cost as from town (2 miles): $12 with a $2 tip. The cutoff zone used to be at Lovers' Lane; now drivers say it's at Young's Way. Lots of working people who don't have cars and many retirees need frequent daily bus service. Many can't afford taxis. Bike paths and sidewalks are often impassable after a snowfall. If they were conscientiously cleared, Robin Harvey would be alive today.
One of my family members does use the bus in the summer to get to a seasonal job. I think limited winter routes makes some sense given the Island's increasing population.
Please
Please add our area!
Please consider how badly Tom Nevers needs service, not only for residents but all the events at the fields and ball leagues create tons of car and bike traffic on a 40 mph rd with no bike path!!
PLEASE DO THIS! It is much needed by so many.
Please extend Madaket service at least till Columbus Day! There are so many timeshare owners who would appreciate this! Thank you!
Please extend service until after the bars close!!! Cut down on drunk driving with more responsible options.
Please find responsibility driver whoes obey the law and drive slow
Please have s shuttle to Tom Nevers Road. We have a lot of workers in our neighborhood.
Please make this happen!
Please make this happen. It would be a huge help for a lot of people who probably don't have access to this survey.
Please open up the mid-island loop year round! I use the bus every day during the summer, sometimes more than four times a day, and I would use that bus if it ran every 20 min or every 15. Hourly does me no good! As long as the bus came every 15 min I would even accept a mid-island loop that was 5 min longer and hit more stops.
PLEASE PLEASE give us year round srvice
Please please please bring back the shuttle in the winter near somerset road. I work on Main Street at Nantucket Looms and if I had the shuttle I would take it everyday to work and most days home unless I got a ride. Please please please I'm not allowed to park near the store and in the winter it's so cold!!!! I know lots of friends that are just like me and work in town. Thank you!!!
Please run the bus year-round for island residents.
Polpis route needs to run every 60 minutes. Every 80 minutes is too infrequent.
Polpis route needs to run in a circle through sconset until 10 pm in high season.
Regular schedules to Amelia Drive and mid-Island shopping in the off-seasonwhen it is more difficult to walk, would be helpful.
Riding the bus instead of taking the car everywhere would make us feel that we're contributing to help to keep the island a little cleaner..
So happy to see thast this is finally being put in place!
Sometimes I cannot use my car to go to and from work at the hospital and I would take the shuttle
Subsidized bus service in the winter is a poor way to handle our tax dollars. If it can pay for itself then go for it!

I think the island will have 0-5 cabs on the road in the winter if the bus service goes year round.
Terrific survey. NRTA is best thing that ever happened to the island. If you expand the service they will ride!
Thank You
thank you for a great service!
Thank you for finally considering this an option on the island!
Thank you so much for doing this. I've had to stop riding my bike this winter and last winter because it was too dangerous to come back in the dark from wherever I went. I also have a lot of friends who stop going out in the winter unless it's really important, because they don't have transportation. And, since I've started volunteering at the food pantry, I recognize some of the patrons standing in the rain and the snow with their children for hours waiting to be picked up. A lot of them don't have waterproof boots, so they're wearing plastic bags inside their shoes. It's also so dangerous for women who don't have cars to have to accept rides from potential predators. Good luck! Please let me know if I can help.
Thanks for thinking of the community
Thank-u for considering running all yr rd. or at least thru the major events; Stroll, Red Ticket Drawing, New Yrs. (saw a lot of folks around!) & start up again at Daffodil vs Memorial Day ?? Part-time schedule during these major events vs the full summer schedule??
The boat commuter service is an excellent idea and I have used that in the past.
The Bus service is an excellent option for getting around the island. Even if you don't expand to year-round, you should keep it going until the end of October as the island is busy through the fall.
The bus would take jobs away from the taxis
The rental car market has a monopoly on the island (one in the winter).
The vehicals are loud.
The wave could become a habit with many people.
The wave is a great service. I would use it more if I didn't have to carry all these tools!
The wave is most helpful to avoid parking scarcity, enjoy a dinner out without a designated driver, and the ferry connector is great.
The Wave is very useful and always appreciated. I would use it more if I could take it to work -airport start work at 8
There are many locals out on their bikes in the bitter cold during three months whom I'm sure would benefit from the NRTA. Also in the event of my car being worked on it would be beneficial.
There are so many residents who would benefit greatly from this service!! Please make it available for all of us who live and work here! Than you!
Think it is a great service even if we don't use it. For bus service to be most effective, it must run more often and all throughout the year. However, that would not be cost effective. Don't know if islanders want to increase their taxes for this service.
Think it's a great idea for those in need of it.
Think its wodnerfil, should have happaened a long time ago
This is a great idea! Even just a single month of winter service as a test run would be helpful. If only one route could be offered in the winter, my request would be the Mid-Island Loop, in order to get to town, my place of work, the grocery store, and the ferries.
This is a necessary service for the year round community.
This is a service that should be available to all residents not just visitors to Nantucket. Even if there are not many who live and use the service in the area that I have a home, perhaps it could be made available once or twice a week in the off season.
This is a well needed year round service. Many people walk or ride their bike to their destination. I often rescue pedestrians if i get a ride during the winter.
This is something we've been waiting and hoping for!Good luck.
this should happen

This would be a great benefit to the working people that do not own a car (and there are many)
This would be huge asset to our year round community. There are so many without vehicles and those that don't want to deal with parking. It's also good for those that want to go out and not drive.
This would be so helpful for our growing year-round community.
This would help out a lot of people that have year round jobs and have to face the difficulties of walking outside in the cold.
This would offer a safe and convenient mode of transport to those who cannot drive, ie. Students under 16, elderly, non-car owners....
Tom Nevers is not even listed as a neighborhood yet has a significant year round population that is only served by stops on the Milestone Road forcing passengers to walk to their homes on Tom Nevers Rd. which is unsafe without sidewalks or a bike path. If year round service was available it would also open up rental opportunities as folks needing housing but without cars could live there
TOM NEVERS!!!! No one on island can understand why the hell you don't have the damn bus come down tom nevers rd in the summer - let alone in the winter. You don't even discuss in in this survey!!
Use the senior van - & taxi's
Used NRTA daily when worked downtown. Office moved out of town.
Used to use the bus a lot when we lived out in fishers landing. Not so much now, but see how it could be useful to others.
Want a year around service! It ll be great for the islanders
We are on island from May until end of September
We are overrun by cars. Bikes and buses will reduce pollution and bring the human touch back to the island.
We are timeshare owners and generally only come in August. Sometimes we use the Wave when company is there and people are coming/going at different hours. In our fall/spring weeks, we'd drive as visitors would be minimal.
We are two miles from the closest Wave stop. If the Wave went into Tom Nevers, we would be much more willing to use the service seasonally and year-round.
We do not need more us traffic cutting off people.
We love the bus and are happy you are there for us in late May.
We need a year round bus service
we need a year round bus service for all the working people on the island !!!
We need the service on the winter , for the people that don't have car.
We need this for winter!
We need to have it year-round
We need year σ perhaps a few vans for Sconset - Madaket - Polpis Rt5 - mid-island to town most needed
We only have one car and it would be great to have this option. I do worry about the cabdrivers' income.
We rarely bring our cars over, so when the Wave isn't operating during the weeks we're there (in December and February), we need to rent cars. Which means that in Feb., we need to take a cab to the airport to rent from that location. Anyway, a year around public transportation system, particularly for those who live and work on the Island year round, would be a very ideal situation for them as well as those who visit the Island frequently. Thanks!
We really need the bus year round
We spend quite a bit of time here off season. This would be a great help even every other hour.
We want to reduce driving and parking hassles + save gas.
We want to reduce driving and parking hassles. We want to save gas and reduce pollutions.
We would love to see any service. You guys are great.
We would mostly be weekends only during the school year but would it during the weekends for miacomet loop
We would spend more time in the shoulder and off season with extended NRTA

When I can't drive anymore will consider it. Probably will use it
When I drive to town, I always have multiple errands planned and need the car to get among them. NRTA is great, but not at age 77.
When the weather is bad I'm basically shut-in. I would use the bus To go to,the food store. Since I'm near Cambridge st. It would be a godsend for me.
When we move To Nantucket I will increase my working for the NHA and having transportation to and from Town would be great.
While I am a seasonal resident, I think it would be valuable to all year rounders. I enjoy using it during the time I am on Island.
While I think public transportation is important, I also hate hearing the bus drive by my house four times an hour like it does on the mid-island route in the summer. I feel that once or, at a maximum, twice an hour would be sufficient in the winter.
While we most likely would not use the shuttle in the midst of winter, we would like the shuttle to start earlier in the year and continue till end of October
Why can't you put in a Tom Nevers route? We go into town often, especially late afternoon or early evening. There is limited space to park a car at the end of Tom Nevers Rd & Milestone.
why not serve the 2000 residents of Tom Nevers
With the increasing amount of people living on the island, it would be great to have an extension of the service throughout the year.
With the number of year round residents and especially seasonal workers walking Tom Nevers Rd. From the Milestone Rd stops, especially at night with no sidewalks, paths and the only occasional mowing of the sides, expansion to the TN field area would be a great thing!
would be a great service
Would be awesome for so many people that need to go shopping(groceries),pharmacy,hospital,eat The year a round population has been changing every year and could save others to not get in trouble
would come to the island more in the winter and spring, if there was bus service during those times of the year!
would like to see this implemented
Would like to see year round service that students can use to get back and forth to school
Would love the NRTA bus to come down Tom Nevers Road for a second stop. Perhaps at the Lyins Road gate.
Would love to see any sort sort of bus service to Madaket maybe to work with the Ferry schedule or the car boat schedule
Year 'round is a good idea for the mid-island area, Too few passengers for Madaket and Sconset.
Year round service of the connector would help with the parking problems in town.
Year round service would be amazing.
Year round service would be very useful! The bus doesn't have to run all day. I'd organize my Sched to make use of the time it was running; ie, three round trips/day, morn, mid., & evening.
Year round wave service is desperately needed by families who don't have cars and who work.
Year Round would be great
Year round would encourage me to visit in the winter months when I can be somewhat assured of getting around
Year-round bus service is LONG overdue... and it would mean we can save the half-million dollars wasted on school bus service, or roll it into the NRTA funds, allowing kids to ride the NRTA to/from school. Only 5% of kids ride the bus. It's a huge waste of money if it can be done by NRTA. Also; "How often do you use the NRTA WAVE in the summer?" is not relative. We all work completely different schedules in the summer.
Yes to year round. More routes, more stops please.
Yes would like to see a Sconset via Old South Bus, one in the morning and one in the afternoon.
You should add service down Tom Nevers Road to the ball field.
You should be expanding on the routes, Bartlett Farm Road and Hummock Pond Road should be included

Appendix B –System Performance Analysis Technical Memorandum

NRTA Year-Round Bus Service Study

System Performance Analysis

Technical Memorandum

Prepared for

Nantucket Regional Transit Authority

Prepared by

AECOM Technical Services Inc.

January 2016

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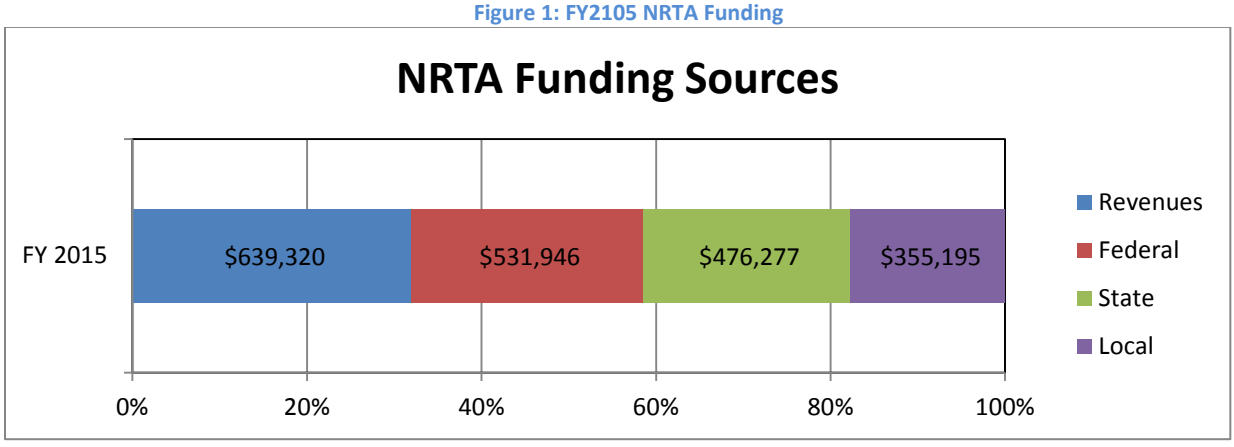
INTRODUCTION

The Nantucket Regional Transit Authority (NRTA) provides island-wide seasonal fixed route transit service, the WAVE, and year-round demand response van service, Your Island Ride. The NRTA was established to alleviate downtown traffic congestion and to create parking opportunities in the downtown core district. The NRTA began providing seasonal fixed route service in 1995 operating four buses on two mid-island area routes. It soon became apparent that the NRTA would become an island-wide transportation system. The NRTA has expanded its services to provide island-wide transportation operating ten routes with 15 buses. In 2014 the NRTA provided Ferry Connector service, a contract service mostly privately funded, between a park-and-ride lot and the ferries. In 2015 service hours were expanded to 12:00 a.m. on the Mid Island Loop, Miacomet Loop, and Sconset via Old South Road Route to better accommodate second shift workers.

The NRTA was created by Massachusetts General Laws Chapter 161B in 1993, although operations did not begin until 1995. The NRTA is a body politic and corporate and political subdivision of the Commonwealth of Massachusetts. According to the statute, regional transit authorities cannot operate service directly, but instead must contract with private operators for the provision of service. The NRTA contracts with Valley Transportation Services of Massachusetts, Inc. to provide operating and management services for the NRTA's seasonal fixed route service and Your Island Ride van service.

Funding sources for NRTA include local, state and federal programs for operating assistance funds as well as capital funding available through the state and federal governments. Local funding is assessed to the Town of Nantucket, and increases are capped at 2.5% per year, unless new service is added. State funding is provided by the Commonwealth of Massachusetts Department of Transportation through state contract assistance. Federal money, through rural operating assistance Section 5311, is provided to the NRTA. Farebox revenue is collected from passengers and pass sales. Other revenue includes advertising revenue and local business financial support for the Ferry Connector. The NRTA's operating budget covers three areas of expense: fixed route bus, demand response and administration.

Figure 1: FY2105 NRTA Funding



NRTA offers a wide range of fares and passes. Mid Island Loop, Miacomet Loop, and Jetties Beach Route have a $1.00 fare, the Ferry Connector will have a base fare of $2 starting with the 2016 season, and the remaining routes have a base fare of $2.00. Half fares are offered to seniors 65 years of age and older, individuals with disabilities, veterans and active military personnel. Free fares are offered to children 6

years of age and younger when accompanied by an adult. The NRTA offers short-term passes: 1-day, 3-day, and 7-day, sold at the farebox. Short-term passes are valid for calendar days only, beginning at the time the pass is purchased. Seasonal and monthly passes are sold at the NRTA Administrative Office. Season passes are $90, commuter passes, if purchased by a business for employees, are $80, Nantucket student passes are $50 and all other students are $80. Discounted seasonal passes are available for seniors, disabled persons, veterans and active military for $50. NRTA also offers a 30-day pass for $50.

Basic statistics collected by route for the fixed route system performance evaluation included:

- Total passenger boardings by route and time of year
- Mileage by route
- Operating hours by route and time of year
- Fare revenue by route and time of year
- Operating cost (divided by revenue hours to calculate by line)
- Fleet information

This report presents an analysis and evaluation of NRTA fixed routes, identifying the strengths and weaknesses of each route, and how each route performs by time of year (summer vs. shoulder seasons). The report is divided into three parts – description of fixed route service, performance evaluation, and route ranking/issues and opportunities.

Description of Existing Routes

The NRTA provides seasonal fixed route public transit service (The WAVE) in Nantucket. The WAVE operates from mid-May to early October on ten routes utilizing 15 vehicles. There are a total of 19 revenue vehicles in the fleet. The route configurations meet the needs of the islands' diverse seasonal community of year-round residents, second home owners, seasonal employees, and both long-term and short-term visitors. Table 1 provides an overview of routes operated by NRTA including the type of service, where it operates, and when the route is in operation.

Table 1: NRTA Overview

Route	Service Type	Description
Mid Island Loop	Commuter/Community	Downtown to the mid-island area
Miacomet Loop	Commuter/Community	Downtown to the outer mid-island area
Sconset via Old South Road Route	Commuter/Community/ Tourist	Downtown to the village of Sconset through a residential and commercial area
Madaket Route	Commuter/Community/ Tourist	Downtown to the village of Madaket and points along the way
Sconset via Milestone Rd Route	Commuter/Community/ Tourist	Downtown to the village of Sconset and points along the way
Airport Route	Commuter/Community	Downtown to Nantucket Memorial Airport and points along the way
Surfside Beach	Tourist	Downtown to Surfside Beach
Jetties Beach	Tourist	Downtown to Jetties Beach
Sconset via Polpis Rd	Tourist/Community	Downtown to the village of Sconset and points along the way

The routes are classified into three different service types and can serve multiple functions. Commuter routes bring people downtown for work and provide connections to the ferries and airport. Community

routes focus on circulating passengers around the island to service civic and shopping destinations. Tourist routes connect to the beaches.

Span and Frequency

Fixed routes are operated from mid-May to Columbus Day. Table 2 through Table 4 list the operating statistics for each route including season of service, span of service[1] and frequency of service. The summer season runs from mid-June to Labor Day, with shoulder seasons on either side.

Table 2: Span of Service Days by Route

Route Name	Service Days
Airport Route	June 27 – September 7, 2015
Ferry Connector	May 21 – October 12, 2015
Jetties Beach	June 22 – September 7, 2015
Madaket Route	May 22 – September 13, 2015
Miacomet Loop	May 18 – October 12, 2015
Mid Island Loop	May 18 – October 12, 2015
Sconset via Milestone Road Route	June 22 – September 7, 2015
Sconset via Old South Road Route	May 18 – October 12, 2015
Sconset via Polpis Road Rotue	June 29 – September 7, 2015
Surfside Beach	June 22 – September 7, 2015

LOS	Hours of Service
A	19-24
B	17-18
C	14-16
D	12-13
E	4-11
F	0-3

NRTA routes start operating at 7:00 AM with the exception of the airport, beach, and additional Sconset service which have limited demand in the morning hours. Routes that run only during the summer season end by 7:15 PM, while the routes that operate during the summer and shoulder months run until midnight (the Ferry Connector ends at 10:00pm with the last boat). The *Transit Capacity and Quality of Service Manual*, produced by the Transit Cooperative Highway Research Program (TCRP) has a level of service (LOS) rating system based on the hours of service provided (see box to the left). Routes with late night service have a LOS score of "B", those that start early but end by 7 PM have a LOS score of "D", and the ones that start at 10:00 AM are LOS "E".

In 2013 state legislation required all Regional Transit Authorities to prepare Regional Transit Plans. These Regional Transit Plans examined ridership trends and conducted performance analysis of the existing system. A cross analysis of transit plans shows that NRTA is performing better than most of the other RTAs in MA, who's highest LOS is a "C".

[1] Morning start time to time of last run

Table 3: Span of Service Hours by Route

Route Name	Summer	Shoulder
Airport Route	10:00 AM to 6:00 PM	---
Ferry Connector	7:00 AM to 10:00 PM	9:40 AM to 9:00 PM
Jetties Beach	10:00 AM to 5:45 PM	---
Madaket Route	7:00 AM to 11:20 PM	7:00 AM to 11:20 PM
Miacomet Loop	7:00 AM to 12:00 AM	7:00 AM to 11:30 PM
Mid Island Loop	7:00 AM to 12:00 AM	7:00 AM to 11:30 PM
Sconset via Milestone Road Route	7:15 AM 7:15 PM	---
Sconset via Old South Road Route	7:15 AM 12:00 AM	7:15 AM to 11:15 PM
Sconset via Polpis Road Route	10:00 AM to 5:20 PM	---
Surfside Beach	10:00 AM to 5:40 PM	---

All but one of NRTA's routes operate at a frequency of service of every 60 minutes or less. Some of the downtown circulator routes offer more frequent service and some of the longer routes offer less frequent service. The *Transit Capacity and Quality of Service Manual* provides a level of service (LOS) rating system based on the average headway as shown in the box to the right. Routes with a shorter headway would have a higher score. The highest score achieved by NRTA is LOS "C" on the Mid Island Loop and the lowest LOS is "F" on the Sconset via Polpis Rd Route.

LOS	Headway (Min)
A	<10
B	10-14
C	15-20
D	21-30
E	31-60
F	>60

Table 4: Frequency of Service by Route

Route Name	Summer	Shoulder
Airport Route	20 min	---
Ferry Connector	20 min	20 min
Jetties Beach	30 min	---
Madaket Route	30 min	60 min
Miacomet Loop	20 min	30 min
Mid Island Loop	15 min	30 min
Sconset via Milestone Road Route	60 min	---
Sconset via Old South Road Route	60 min	60 min
Sconset via Polpis Road Route	1 hr 20 min	---
Surfside Beach	40 min	---

Operating Speed

Calculating average operating speeds allows for the identification of routes that may be too long for the running time allotted, or may be running slowly and unreliably due to congestion. As such, average operating speeds are also indicators of safety, as routes that are too long require drivers to drive rapidly to keep on schedule; and reliability, since very slow routes may create problems with on-time performance and transfers. Slower routes are can also be an indicator of areas with higher vehicular traffic. Table 5 lists average operating speed by route and season and the roundtrip miles per trip and cycle time for each route. The trip length is consistent throughout the year but travel times may change with an influx of summer traffic. The NRTA system as a whole averages 11.2 MPH operating speed.

Table 5: Operating Speed

Route Name	Speed (MPH)		Miles	Cycle Time	
	Summer	Shoulder		Summer	Shoulder
Airport Route	6.6	--	6.6	60	0
Ferry Connector	see Airport	9.6	3.2	0	20
Jetties Beach	3.88	--	1.94	30	0
Madaket Route	12.5	12.5	12.5	60	60
Miacomet Loop	10.5	14	7	40	30
Mid Island Loop	8.2	8.2	4.1	30	30
Sconset via Milestone Road Route	15.8	--	15.8	60	0
Sconset via Old South Road Route	17.1	17.1	17.1	60	60
Sconset via Polpis Road Route	15.75	--	21	80	0
Surfside Beach	10.2	--	6.8	40	0

SERVICE OPERATIONS

Fleet Analysis

As of December 2015, the NRTA-owned fleet consisted of 19 fixed route vehicles consisting primarily of 25-29-foot diesel transit buses, all of which were manufactured in 2006 or later. In addition, all NRTA vehicles are wheelchair accessible in accordance with requirements of the Americans with Disabilities Act of 1990 (ADA). The oldest buses in the fleet, with the most miles, are the 29' Eldorado Escort RE, medium duty buses. All of the Escort REs are past their useful life of 7 years but not useful mileage of 200,000. The remaining fleet includes medium duty buses made by IC Bus. Due to roadway geometry and historic building placement and roadway width/alignment constraints, NRTA must operate vehicles below 30' in length and 96" in width.

Table 6: Revenue Fleet Inventory

Bus #	Year	Make	Model	Size	Mileage
1	2008	Eldorado	Escort RE	29	108,610
2	2007	Eldorado	Escort RE	29	100,442
3	2010	IC	HC CB	25	70,734
4	2016	IC	HCTC	29	12,675
5	2012	IC	HCCB	25	59,867
6	2013	IC	HC	25	40,560
7	2011	IC	HC CB	25	82,529
8	2013	IC	HC	25	41,191
9	2006	Eldorado	Escort RE	29	137,916
10	2006	Eldorado	Escort RE	29	127,257
11	2011	IC	HC CB	25	98,825
12	2011	IC	HC CB	25	72,867
13	2013	IC	HCTC	25	34,673
14	2011	IC	HC CB	25	63,884
15	2013	IC	HCTC	25	44,708
16	2013	IC	HCTC	25	32,963
17	2013	IC	HCTC	25	20,962
18	2011	IC	HC CB	25	45,727
24	2016	IC	HC	25	8,895

Labor Requirements

Labor requirements were calculated based on the number of daily revenue hours per route plus one hour of pre and post trip inspection per bus for each time period. Daily hours were then multiplied by the number of days a week that service runs and divided by 40 hours, the number of hours a full-time employee would work. During the peak summer season from July to Labor Day, NRTA needs 37 full time operators (Figure 2). For a complete breakdown of labor requirements by route and time of year see Table 7.

Figure 2: NRTA 2015 Labor Requirements

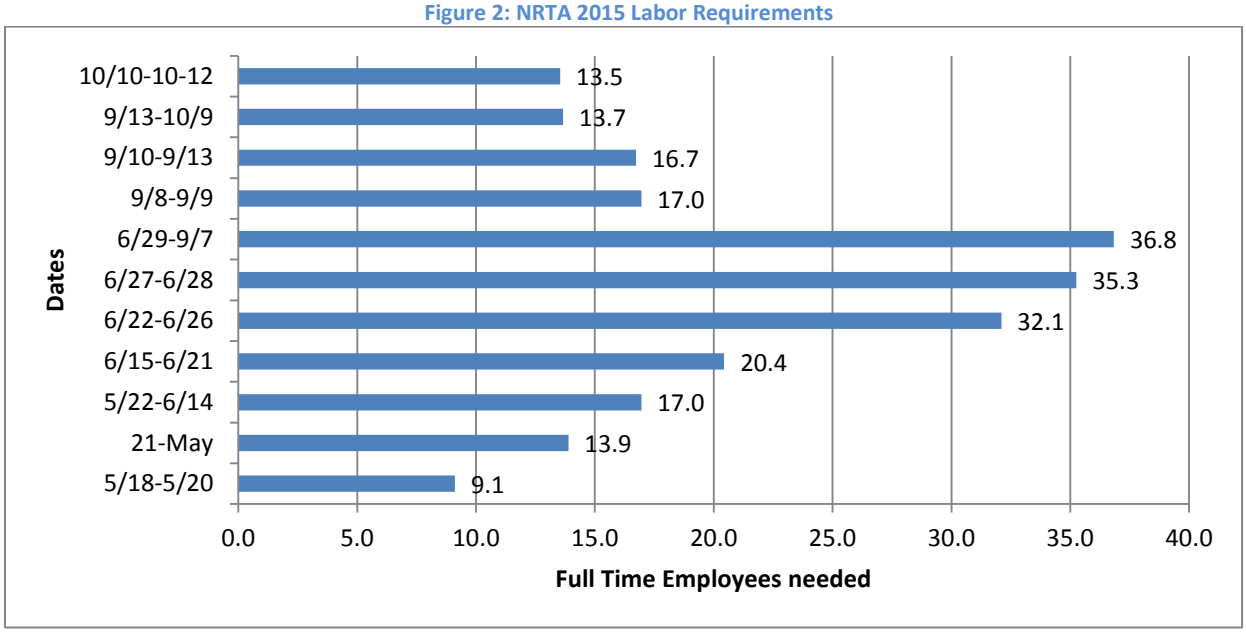


Table 7: Daily Labor Requirements by Route and Time of Year

2015	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.
Mid Island	May 18-31 17.5 rev hrs/day **2.19 Employees/ day**	June 1-14 17.5 rev. hrs/day **2.19 Employees/ day** June 15-21 18 rev. hrs/day **2.25 Employees/ day** June 22-30 36 rev. hrs/day **4.5 Employees/ day**	July 1- 31 36 rev. hrs/day **4.5 Employees/ day**	August 1 –31 35 rev. hrs/day **4.38 Employees/ day**	Sept. 1-7 36 rev. hrs/day **4.5 Employees/ day** Sept. 8-30 17.5 rev. hrs/day **2.19 Employees/ day**	Oct. 1-12 17.5 rev. hrs/day **2.19 Employees/ day**
Miacomet	May 18-31 17.5 rev hrs/day **2.19 Employees/ day**	June 1-14 17.5 rev hrs/day **2.19 Employees/ day** June 15-30 36 rev. hrs/day **4.5 Employees/ day**	July 1 – 31 36 rev. hrs/day **4.5 Employees/ day**	August 1-31 36 rev. hrs/day **4.5 Employees/ day**	Sept. 1-7 36 rev. hrs/day **4.5 Employees/ day** Sept. 8-30 17.5 rev hrs/day **2.19 Employees/ day**	Oct. 1-12 17.5 rev hrs/day **2.19 Employees/ day**
Madaket	May 22-31 17.5 rev hrs/day **2.19 Employees/ day**	June 1-21 17.5 rev hrs/day **2.19 Employees/ day** June 22-30 35 rev. hrs/day **4.38 Employees/ day**	July 1 –31 35 rev. hrs/day **4.38 Employees/ day**	August 1 –31 35 rev. hrs/day **4.38 Employees/ day**	Sept. 1-7 35 rev. hrs/day **4.38 Employees/ day** Sept. 8-13 17.5 rev hrs/day **2.19 Employees/ day**	No Service
Polpis	No Service	June 29-30 9 rev hrs/day **1.13 Employees/ day**	July 1 –31 9 rev hrs/day **1.13 Employees/ day**	August 1 –31 9 rev hrs/day **1.13 Employees/ day**	Sept.1-7 9 rev hrs/day **1.13 Employees/ day**	No Service
Old South	May 18 – 31 17 hrs/day **2.13 Employees/ day**	June 1-14 17 hrs/day **2.13 Employees/ day** June 15-30 18 hrs/day **2.25 Employees/ day**	July 1 –31 18 hrs/day **2.25 Employees/ day**	August 1-31 18 hrs/day **2.25 Employees/ day**	Sept 1 –7 18 hrs/day **2.25 Employees/ day** Sept 8 –30 17 hrs/day **2.13 Employees/ day**	Oct. 1-12 17 hrs/day **2.13 Employees/ day**
Milestone	No Service	June 22-30 13 hrs/day **1.63 Employees/ day**	July 1 –31 13 hrs/day **1.63 Employees/ day**	August 1 –31 13 hrs/day **1.63 Employees/ day**	Sept. 1- 7 13 hrs/day **1.63 Employees/ day**	No Service
Surfside	No Service	June 22-30 9 rev hrs/day **1.13 Employees/ day**	July 1 –31 9 rev hrs/day **1.13 Employees/ day**	August 1-31 9 rev hrs/day **1.13 Employees/ day**	Sept. 1- 7 9 rev hrs/day **1.13 Employees/ day**	No Service
Jetties	No Service	June 22-30 9 rev hrs/day **1.13 Employees/ day**	July 1-31 9 rev hrs/day **1.13 Employees/ day**	August 1 –31 9 rev hrs/day **1.13 Employees/ day**	Sept. 1- 7 9 rev hrs/day **1.13 Employees/ day**	No Service
Airport	No Service	June 27- 30 18 rev hrs/day **2.25 Employees/ day**	July 1-31 18 rev hrs/day **2.25 Employees/ day**	August 1-31 18 rev hrs/day **2.25 Employees/ day**	Sept. 1- 7 18 rev hrs/day **2.25 Employees/ day**	No Service
Ferry Connector	May 21- 31 27.3 hrs/day **3.41 Employees/ day**	June 1-30 27.3 hrs/day **3.41 Employees/ day**	July 1-31 27.3 hrs/day **3.41 Employees/ day**	August 1-31 27.3 hrs/day **3.41 Employees/ day**	Sept 1 –10 27.3 hrs/day **3.41 Employees/ day** Sept 11 –30 26 hrs/day **3.25 Employees/ day**	Oct. 1-9 26 hrs/day **3.25 Employees/ day** Oct. 10-12 25.3 hrs/day **3.16 Employees/ day**

Service Capacity

Capacity is measured as the maximum number of passengers that can be carried daily during the peak season. The capacity of the system was determined by the number of one way trips or loops daily for each route multiplied by the vehicle's capacity. NRTA has an average seated vehicle capacity of 18 with a vehicle capacity of 23 (seated capacity plus 25% of the seated capacity for standees). During the peak summer months the daily capacity is almost 8,300 passengers (Table 8). The route with the highest capacity is the Mid Island Loop because it has the longest service span and shortest headway.

Table 8: Route Capacity

Route Name	Capacity	
	Summer	Shoulder
Airport Route	1,104	---
Ferry Connector	See Airport	1,564
Jetties Beach	713	---
Madaket Route	1,502	751
Miacomet Loop	1,173	759
Mid Island Loop	1,564	759
Sconset via Milestone Road Route	690	---
Sconset via Old South Road Route	771	736
Sconset via Polpis Road Route Route	253	---
Surfside Beach	529	---
Total Daily	8,298	4,569

ROUTE DIAGNOSTICS

Five important data sets were collected or calculated from NRTA 2015 records to create the route diagnostics: ridership statistics, revenue hours, revenue miles, operating cost, and farebox revenue. Route diagnostic statistics are described for each of the 10 fixed routes in Table 9.

Table 9: System-Wide Operating Statistics by Route

Route Name	Annual Revenue Miles	Annual Revenue Hours	Fare Revenue	Operating Cost (based on $64/hr)	Annual Ridership
Airport Route	15,200	3,003	$23,018	$205,387	11,339
Ferry Connector	9,564	3,999	$247,535	$273,507	9,298
Jetties Beach	2,246	624	$14,596	$42,678	14,873
Madaket Route	40,295	3,185	$76,819	$217,834	43,209
Miacomet Loop	40,569	3,740	$70,392	$255,793	63,771
Mid Island Loop	27,860	3,584	$63,919	$245,124	56,466
Sconset via Milestone Road Route	13,198	936	$31,096	$64,017	17,371
Sconset via Old South Road Route	38,746	2,452	$96,912	$167,702	56,583
Sconset via Polpis Road	8,520	568	$12,264	$38,848	6,551
Surfside Beach	6,458	624	$29,376	$42,678	16,133
Fixed Route System Total	**202,656**	**22,715**	**$665,926**[2]	**$1,553,566**	**295,594**

[2] The difference in farebox recovery from Table 1 and Table 9 is due to the reporting periods. Table 1 is FY2015 (July 2014 – June 2015 and Table 9is Calendar Year 2015.

In 2015, the fixed routes operated over 200,000 miles of service, 22,000 hours of service and provided nearly 300,000 rides. Fare revenue and revenue from the Ferry Connector contracts generated $666,000, offsetting approximately 44% of the $1.5 million in fixed route operating costs.

The diagnostic calculations for farebox recovery, passengers per mile, passengers per hour, cost per mile cost per passenger and subsidy per passenger are presented in Table 10, values in green indicate a better performance than the state average[3]. For each of the diagnostic indicators, each route will be ranked and compared to the other routes in the system and also compared to the system average. Routes are compared to 60% and 80% of the systems average for comparison/reference purposes to determine the health of the route[4].

NRTA is a rural system performing like an urban

- Pax/Hr - Passengers per hour is a measure of productivity and service effectiveness
- Pax/Mile - Passengers per mile is a measure of productivity and service effectiveness
- Farebox Recovery - Measures the portion of operating costs covered by passenger fares/contracts
- $/Mile - Cost per mile is a measure of financial efficiency based on the service provided
- $/Pax - Cost per passenger is a measure of financial efficiency based on the number of riders
- Subsidy/Pax - Measures how much it costs to operate a route on a per-passenger basis

Table 10: System-Wide Route Diagnostics

Route Name	Farebox Recovery	Passengers per Mile	Passengers per Hour	Cost per Mile	Cost per Passenger	Subsidy/ passenger
Airport Route	**11.2%**	**0.75**	**3.78**	**$13.51**	**$18.11**	**$16.08**
Jetties Beach	34.2%	6.62	23.83	$19.00	$2.87	$1.89
Madaket Route	35.3%	1.07	13.57	$5.41	$5.04	$3.26
Miacomet Loop	27.5%	1.57	17.05	$6.31	$4.01	$2.91
Mid Island Loop	26.1%	2.03	15.76	$8.80	$4.34	$3.21
Sconset via Milestone Rd	48.6%	1.32	18.56	$4.85	$3.69	$1.90
Sconset via Old South Rd	57.8%	1.46	23.08	$4.33	$2.96	$1.25
Sconset via Polpis Rd	31.6%	0.77	11.53	$4.56	$5.93	$4.06
Surfside Beach	68.8%	2.50	25.85	$6.61	$2.65	$0.82
Fixed Route System Total	**32.6%***	**1.54**	**15.90**	**$8.05**	**$5.22**	**$3.81**
Ferry Connector	90.5%**	0.97	2.33	$28.60	$29.42	$2.79

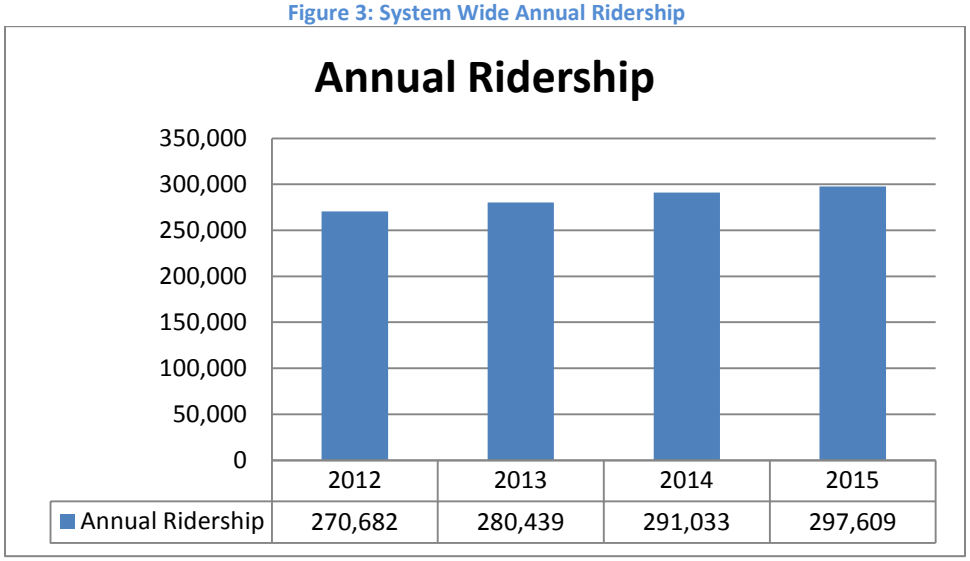
[3]The state average for all Regional Transit Authorities' fixed route service in MA, this does not include the MBTA.

[4] The use of 60% of the system average as the lower threshold for service performance analysis is based on service standards work completed for transit service operators around the country.

Ridership

The Wave carried nearly 300,000 passengers in 2015 and has experienced steady growth in ridership over the last four years. Ridership increased 9.9% from 2012 to 2015 (Figure 3) with the largest increases seen on the Jetties Beach Route and Sconset via Milestone Road Route. The Ferry Connector, initiated in 2014, saw the largest growth with 44.1%.

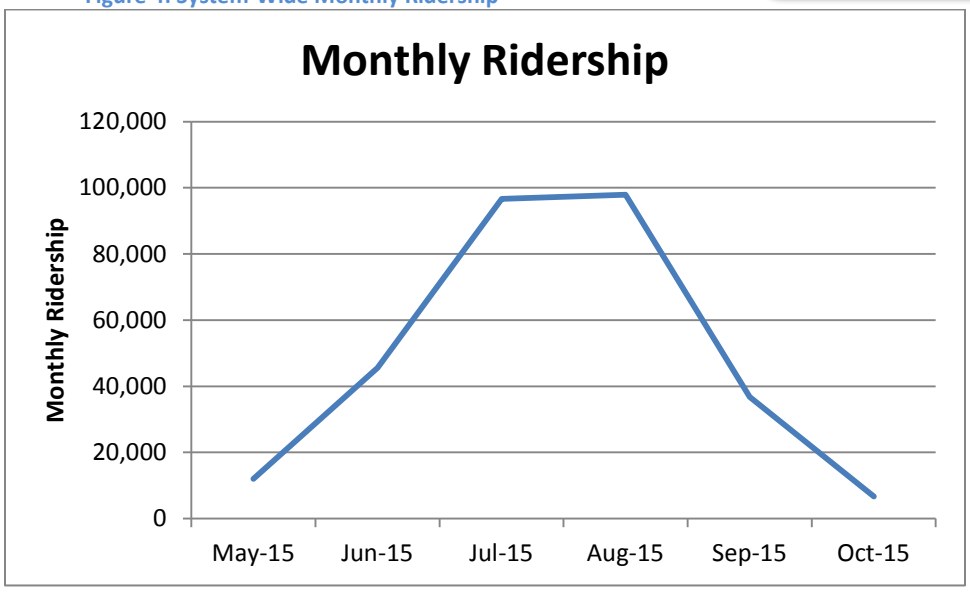
Figure 3: System Wide Annual Ridership



The Wave averages about 95,000 passengers each month during the peak summer operating season with about 65% of total boardings for the year, as seen in Figure 4. Ridership drops during the early summer and late summer months when there is a reduction in seasonal population, reduced service hours, and parking availability is less restricted in the downtown area. Even in the shoulder seasons NRTA carries more riders than other RTAs in the state with year-round service.

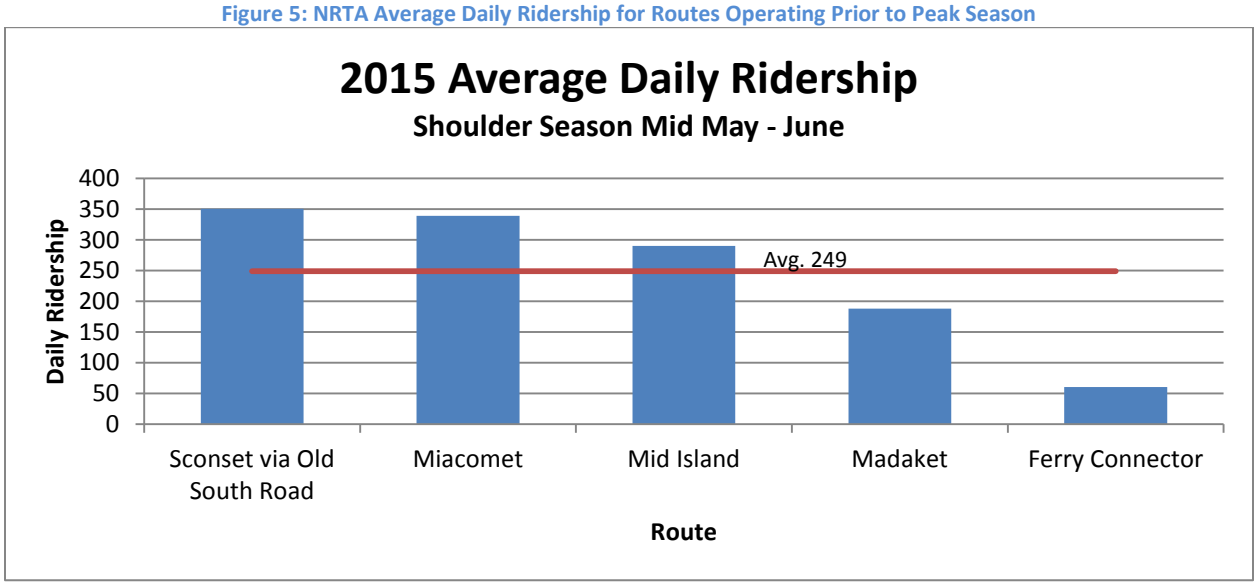
Average daily shoulder ridership is 2x higher than the system ridership of two other state RTAs which have year-round service

Figure 4: System-Wide Monthly Ridership



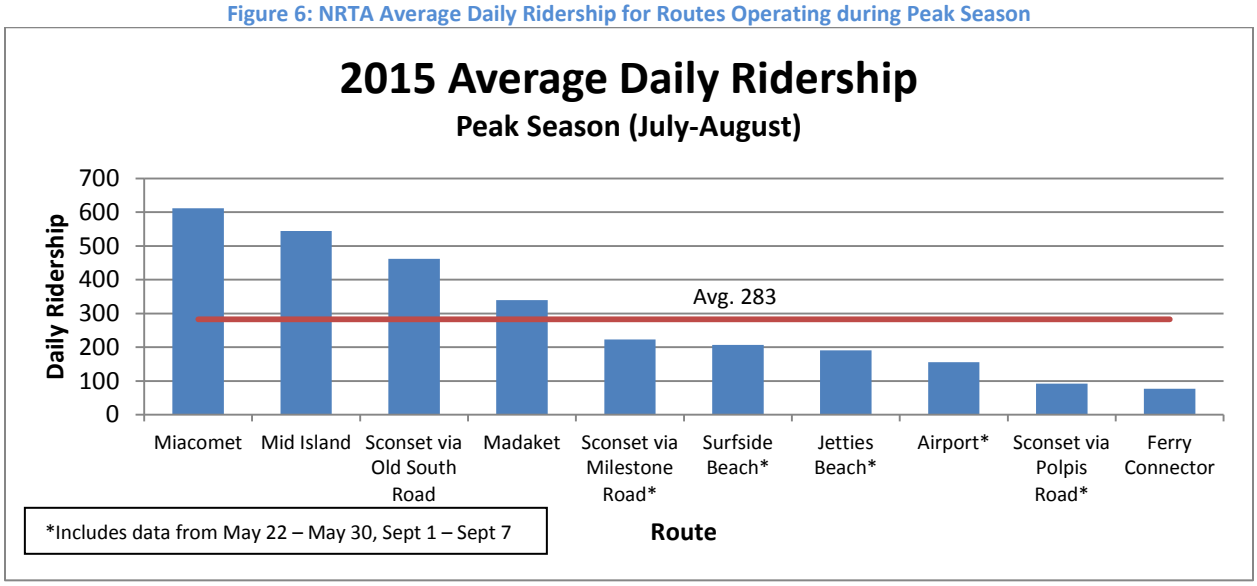
Average daily 2015 system ridership for the period prior to the peak service season was 1,228 passengers; this is a 9.6% increase from 2013. The Sconset via Old South Road Route has the highest ridership of the five routes that operate in the shoulder seasons with an average of 350 passengers per day. Ridership for routes operating prior to the peak season is shown in Figure 5.

Figure 5: NRTA Average Daily Ridership for Routes Operating Prior to Peak Season



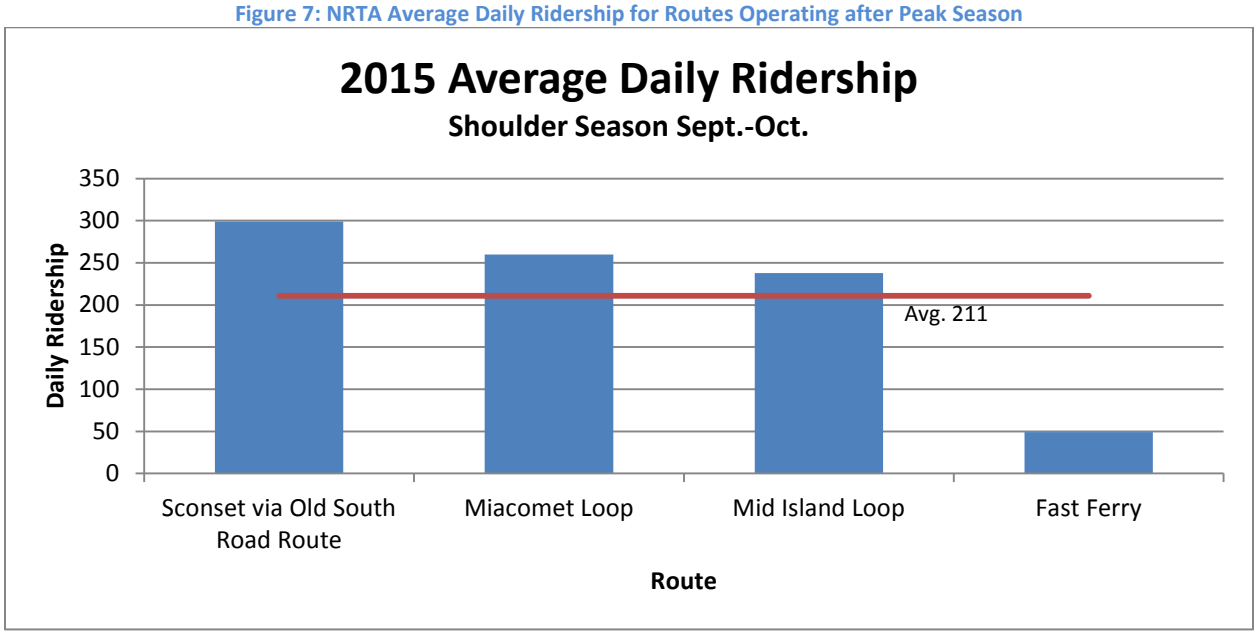
During the peak season, average system ridership is 2,902 passengers per day, with an average of 283 passengers per bus route. Note that this average includes select data from late May and early September for services that run purely during the peak season. The Miacomet Loop has the highest ridership out of all routes in the system. The top four routes all operate into the shoulders of the summer peak season, and account for 66% of system ridership during the peak. Ridership for routes operating during the peak season is shown in Figure 6.

Figure 6: NRTA Average Daily Ridership for Routes Operating during Peak Season



After the peak season, ridership drops considerably as does the level of service, with average daily ridership in the system down to 846 passengers per day. The Sconset via Old South Road Route has the strongest ridership at 299 passengers per day for this period. Service ends in the middle of October as seasonal population decreases. Ridership for routes operating after the peak season is shown in Figure 7.

Figure 7: NRTA Average Daily Ridership for Routes Operating after Peak Season



Service Effectiveness

Service effectiveness describes the amount of service utilized per unit of transit service provided. Service effectiveness is measured based on two indicators: passengers per mile and passengers per hour. While both passengers per mile and passengers per hour are presented, only passengers per mile is included in the route scoring and ranking presented at the end of the route diagnostics section to avoid duplication. Passengers per revenue mile and hour by route are presented in Table 11.

Table 11: Service Effectiveness by Route

Route Name	Passengers per Mile (PpM)	PpM Rank	Passengers per Hour(PpH)	PpH Rank
Airport Route	0.75	10	3.78	9
Ferry Connector	0.97	8	2.33	10
Jetties Beach	6.62	1	23.83	2
Madaket Route	1.07	7	13.57	7
Miacomet Loop	1.57	4	17.05	5
Mid Island Loop	2.03	3	15.76	6
Sconset via Milestone Road Route	1.32	6	18.56	4
Sconset via Old South Road Route	1.46	5	23.08	3
Sconset via Polpis Road	0.77	9	11.53	8
Surfside Beach	2.50	2	25.85	1

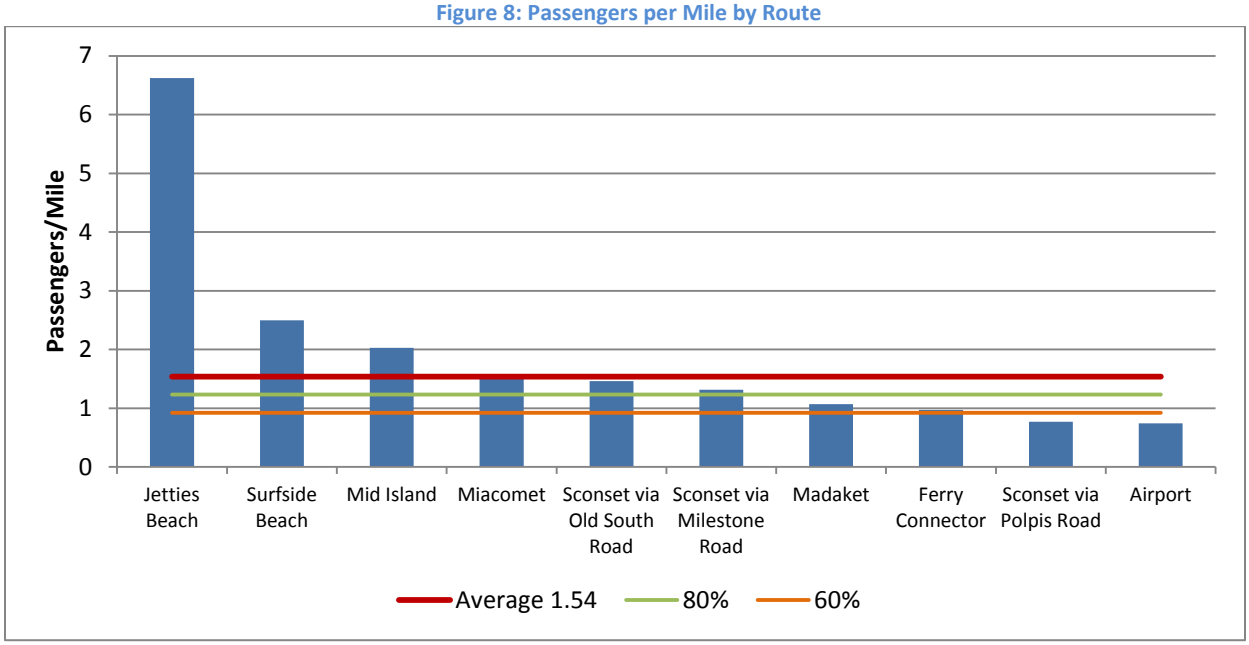
Passengers per Mile

NRTA averages 1.54 passengers per mile on the fixed routes. Sixty percent of the system average is 0.92 passengers per mile; 2 routes are below 60% of the system average. Eighty percent of system average is 1.23 passengers per mile; two routes fall between 60% and 80% of system average. Figure 8 charts passengers per mile by route along with the system average and 80% and 60% thresholds. In this chart, above the system average line is a higher rank. Jetties Beach Route[5] had the highest passengers per revenue mile with 6.62.

The statewide average is 1.56 passengers per mile, this is skewed higher by the large Regional Transit Authorities (RTAs) in urban areas. NRTA is ranked 5th amongst all RTAs in the state and of the four predominantly rural RTAs[6] in Massachusetts they are ranked first. According to the *2014 Rural Transit Fact Book* the national average for passengers per mile for rural transit service providers[7] is 0.59, NRTA is 164% above the average. In the Federal Transit Administration (FTA) Region 1 (New England), the average is 0.76 passengers per mile, Nantucket is more than twice this.

Passengers per Mile is more than 2X better than the average for all New England rural transit providers

Figure 8: Passengers per Mile by Route



[5] Ridership per revenue mile is high on this route because each loop is only 1.8 miles long, while ridership per revenue hour is comparable to the rest of the system because it takes 30 minutes to complete one loop/trip in order to maintain a clock face schedule.

[6] Franklin Regional Transit Authority, Berkshire Regional Transit Authority, Martha's Vineyard Transit Authority, Nantucket Regional Transit Authority,

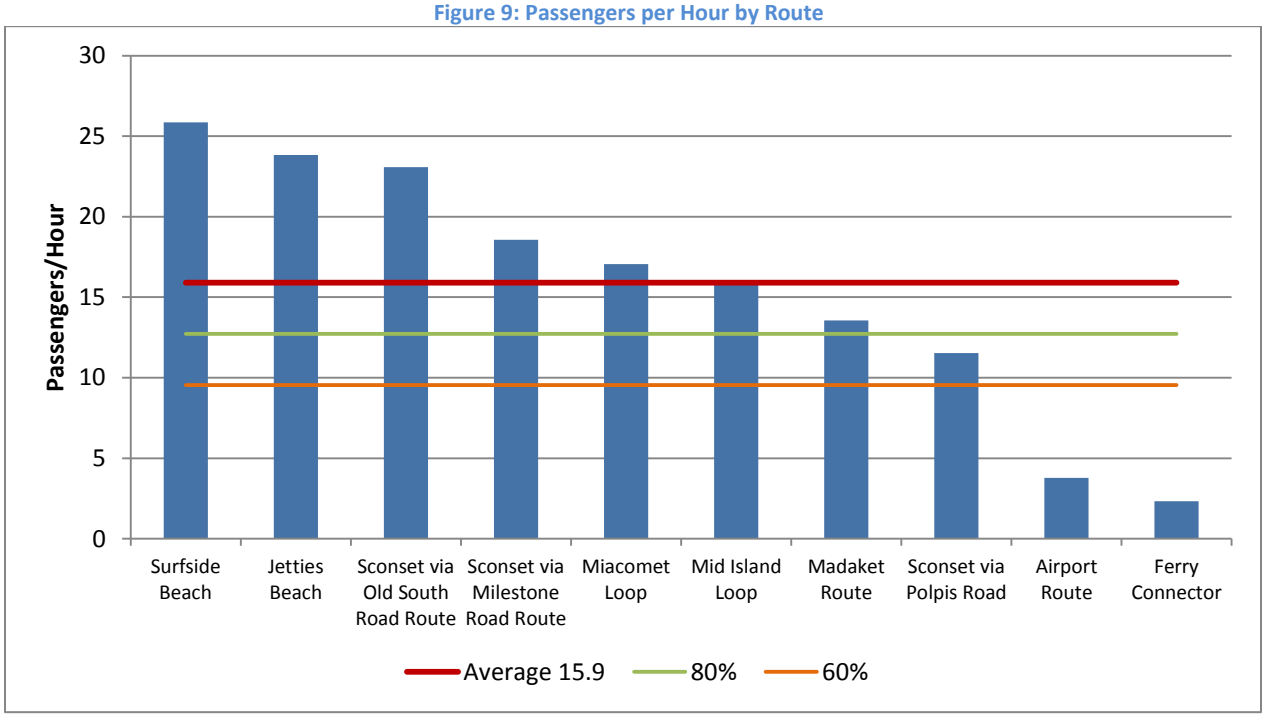
[7] Urban areas are defined by the census as areas having more than 50,000 people with a core area density of 1,000 people per square mile or greater. The FTA Formula Grants For Other than Urbanized Areas is a rural program that is formula based and provides funding to states for the purpose of supporting public transportation in rural areas, with population of less than 50,000.

Passengers per Hour

NRTA fixed routes average 15.9 passengers per hour. Sixty percent of the system average is 9.54 passengers per hour; two routes are below 60% of the system average. Eighty percent of the system average is 12.72 passengers per hour; one route falls between 60% and 80% of system average. Figure 9 charts passengers per hour by route along with the system average. In this chart, above the line is a higher rank.

The statewide average is 21.5 passengers per hour, this is skewed higher by the large Regional Transit Authorities (RTAs) in urban areas. NRTA is ranked 8th amongst all RTAs in the state and of the four predominantly rural RTAs in Massachusetts NRTA is second. According to the *2014 Rural Transit Fact Book* the national average for passengers per hour for rural transit service providers is 10.8, NRTA is 20% above the average.

Figure 9: Passengers per Hour by Route



Financial Efficiency

Financial efficiency measures the cost of providing transit service per unit of service provided. During peak service NRTA operates up to 15 buses for 8 to 17 hours a day costing $14,000 daily. Two indicators, cost per mile and cost per hour, can be used to determine financial efficiency. Since the daily operating cost was determined using an average cost per hour figure for the system as a whole and not for each individual route, only the cost per mile indicator varies from route to route in this analysis and therefore is presented for the review of financial efficiency.

Table 12: Financial Efficiency by Route

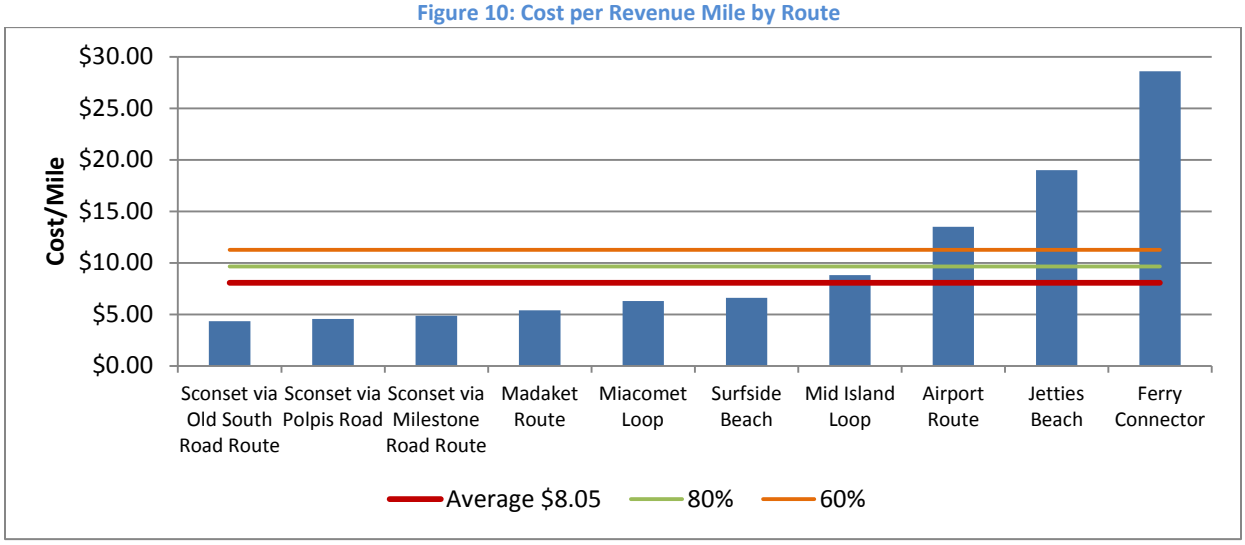
Route Name	Costs per Mile (CpM)	CpM Rank
Airport Route	$13.51	8
Ferry Connector	$28.60	10
Jetties Beach	$19.00	9
Madaket Route	$5.41	4
Miacomet Loop	$6.31	5
Mid Island Loop	$8.80	7
Sconset via Milestone Road Route	$4.85	3
Sconset via Old South Road Route	$4.33	1
Sconset via Polpis Road	$4.56	2
Surfside Beach	$6.61	6

Cost per Mile

The WAVE cost per mile averages $8.05 for the fixed route network. Costs per mile more than $11.27 are more than 60% of the system average; three routes fall into this category. Costs per mile between $9.66 and $11.27 are between 60% and 80% of system average; no route falls into this category. Figure 10 charts cost per mile by route along with the system average. In this chart, below the average line is a higher rank.

The statewide average cost per mile is $6.57, this is skewed higher by the large Regional Transit Authorities (RTAs) in urban areas. According to the *2014 Rural Transit Fact Book* the national average operating cost per mile for rural transit service providers $3.04. This cost is because low because operating speeds tend to be higher in rural areas due to less traffic which allows of a greater number of miles for the same cost.

Figure 10: Cost per Revenue Mile by Route



Cost Effectiveness

Cost effectiveness measures the effectiveness of the system from a financial standpoint – how well the dollars put into the system are being used to produce trips. The cost effectiveness indicators are cost per passenger, farebox recovery and subsidy per passenger.

Table 13: Cost Effectiveness by Route

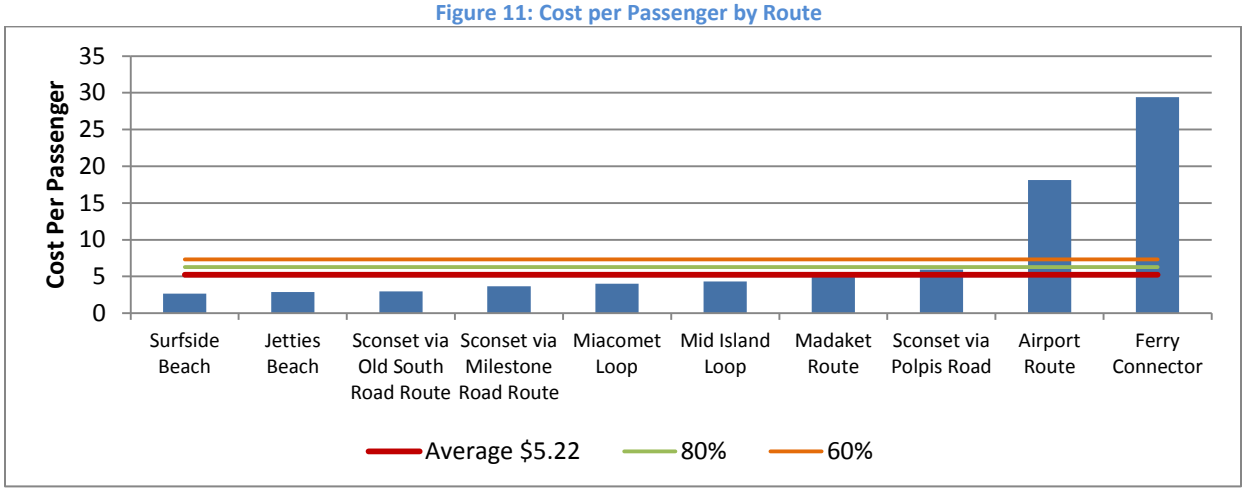
Route Name	Farebox Recovery (FR)	FR Rank	Cost per Passenger (CpP)	CpP Rank	Subsidy per Passenger	SpP Rank
Airport Route	11.2%	10	$18.11	9	$16.08	10
Ferry Connector	90.5%	1	$29.42	10	$2.79	5
Jetties Beach	34.2%	6	$2.87	2	$1.89	3
Madaket Route	35.3%	5	$5.04	7	$3.26	8
Miacomet Loop	27.5%	8	$4.01	5	$2.91	6
Mid Island Loop	26.1%	9	$4.34	6	$3.21	7
Sconset via Milestone Road Route	48.6%	4	$3.69	4	$1.90	4
Sconset via Old South Road Route	57.8%	3	$2.96	3	$1.25	2
Sconset via Polpis Road	31.6%	7	$5.93	8	$4.06	9
Surfside Beach	68.8%	2	$2.65	1	$0.82	1

Cost per Passenger

Cost per passenger is the overall cost to operate the route divided by the number of passengers, for NRTA it averages $5.22 for NRTA fixed routes. Costs per passenger $7.31 and above are 60% of the system average; two routes fall into this category. Costs per passenger between $6.26 and $7.31 are between 60% and 80% of the system average; no routes falls into this category. Figure 11 charts cost per passenger by route along with the system average. In this chart, below the line is a higher rank.

The statewide average cost per passenger is $4.22, this is skewed higher by the large Regional Transit Authorities (RTAs) in urban areas. NRTA is ranked 5th amongst all RTAs in the state and of the four predominantly rural RTAs in Massachusetts they are ranked second. According to the *2014 Rural Transit Fact Book* the national average for cost per passenger for rural transit service providers is 7.42, NRTA is 41.3% better than the average. In the Federal Transit Administration (FTA) Region 1 (New England), the average cost per passenger is $11.46, Nantucket is 118% better than this.

Figure 11: Cost per Passenger by Route



Farebox Recovery

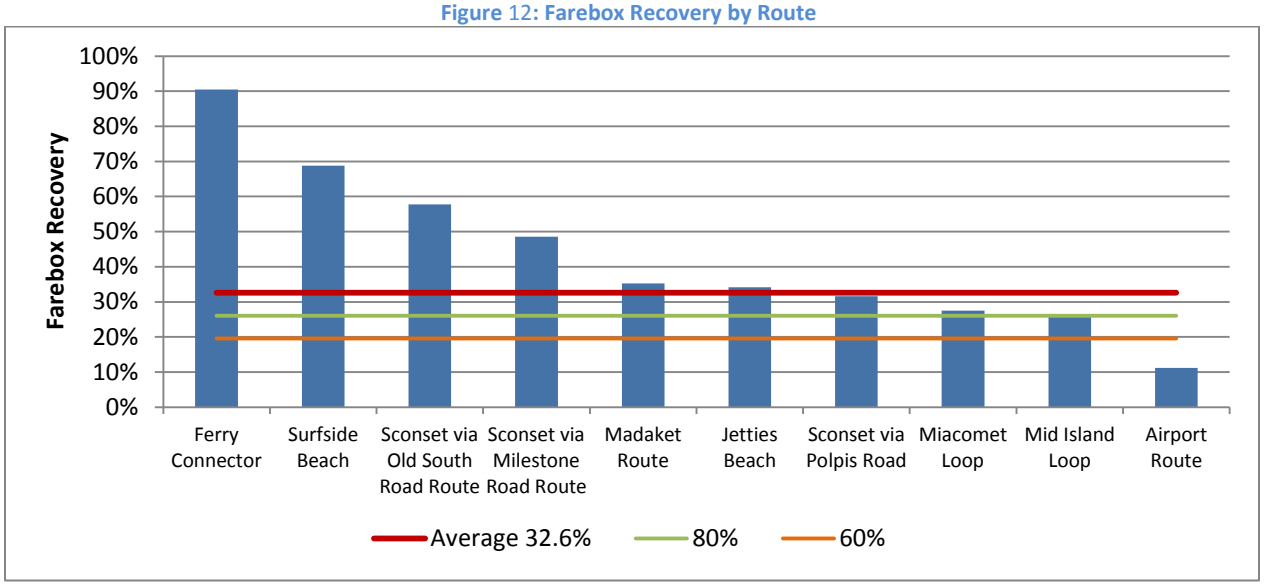
Farebox recovery measures the percent of operating cost covered by fares and is an outcome heavily influenced by the ridership productivity of a route against its total operating cost, as well as the fare policy of the system. It is calculated by dividing fare revenue by operating cost. For all NRTA fixed routes, the overall farebox recovery rate is 32.6%[8].

Farebox recovery of less than 19.6% is below 60% of the system average; one route falls within this category. Farebox recovery between 19.6% and 26.1% is between 60% and 80% of system average; one route fall within this category. Figure 12 charts farebox recovery by route along with the system average. In this chart, above the line is a higher rank. Nationwide transit systems strive for 20% farebox recovery, any route above this is considered to be operating well.

NRTA has the top farebox recovery in the state for bus service including the MBTA

The statewide average farebox recovery is 19.4%, this includes the urban RTAs with higher ridership and funds received through contracts such as those with Universities. NRTA is ranked 1st amongst all RTAs in the state. According to the *2014 Rural Transit Fact Book* the national average farebox recovery for rural transit service providers is 8% , NRTA is five times better than the average. In the Federal Transit Administration (FTA) Region 1 (New England), the average farebox recovery is 6%, Nantucket far exceeds this value.

Figure 12: Farebox Recovery by Route



Subsidy per Passenger

Subsidy per passenger measures how much it costs to operate a route on a "per passenger" basis. It is calculated by subtracting passenger revenue from operating cost and dividing by the total number of passengers. Subsidy per passenger averages $3.81

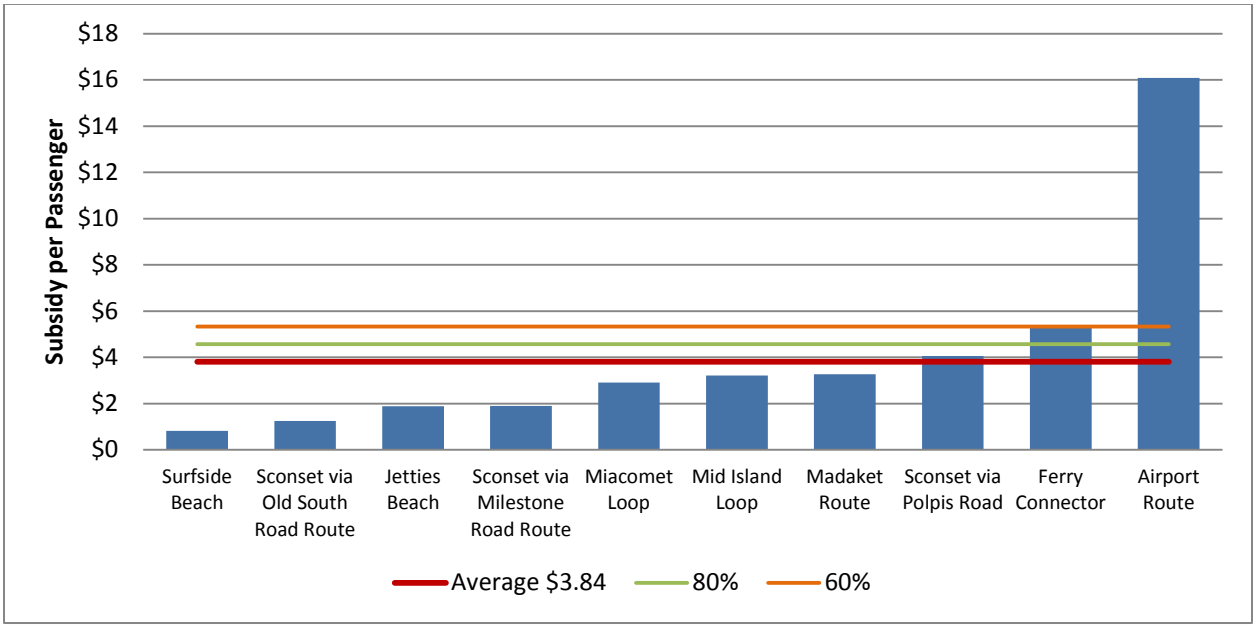
NRTAs low subsidy per passenger indicates a financially efficient system

[8] Does not include dedicated revenue for the Ferry Connector

for NRTA fixed routes. Subsidy per passenger $5.33 and above are 60% of the system average; one route fall into this category. Subsidy per passenger between $4.57 and $5.33 are between 60% and 80% of the system average; one route falls into this category. Figure 13 charts cost per passenger by route along with the system average. In this chart, below the line is a higher rank.

The statewide average subsidy per passenger is $3.41, this includes the urban RTAs with higher ridership and funds received through contracts such as those with universities. NRTA is ranked 4th amongst all RTAs in the state and second amongst the rural ones.

Figure 13: Subsidy per Passenger by Route



Route Ranking

The rankings of each of the routes for two indicators can be used to calculate a cumulative rank score for each route. The two indicators include passengers per mile to rate service effectiveness and farebox recovery to rate cost effectiveness. Financial efficiency was not used in the cumulative rank score because the ratings of the routes in this category correlated directly to route length, which does not measure performance. Routes with a lower rank (i.e. a higher number) are indicative of poorer performing routes. Routes with a higher rank (i.e. a lower number) are generally better performing routes. A rank of 1 is indicative of the best performing route for a particular measure and a rank of 10 is indicative of the worst performing route for a particular measure. The ranking, in combination with route performance and shoulder season ridership can be used as indicators as to which route may perform well in the off-season.

Table 14 shows the cumulative ranking of routes, routes in bold operate during the shoulder season. Overall, the beach routes are the best performers in the system as they have short service spans and concentrated ridership. Of the routes that operate during the shoulder season, the Sconset via Old South Road Route has the highest rank.

Table 14: Route Ranking

Route Name	Passengers per Mile	PpM Rank	Farebox Recovery (FR)	FR Rank	Cumulative Rank Score	Overall Rank
Surfside Beach	2.50	2	69%	2	4	1
Jetties Beach	6.62	1	34%	6	7	2
Sconset via Old South Road Route	**1.46**	**5**	**58%**	**3**	**8**	**3**
Ferry Connector	**0.97**	**8**	**91%**	**1**	**9**	**4**
Sconset via Milestone Road Route	1.32	6	49%	4	10	5
Madaket Route	**1.07**	**7**	**35%**	**5**	**12**	**6**
Miacomet Loop	**1.57**	**4**	**28%**	**8**	**12**	**6**
Mid Island Loop	**2.03**	**3**	**26%**	**9**	**12**	**6**
Sconset via Polpis Road	0.77	9	32%	7	16	9
Airport Route	0.75	10	11%	10	20	10

Summary of Key Findings

The following are some key findings from the system performance analysis:

- NRTA is able to stretch the minimum useful life of their vehicles (as defined by the FTA) by not running in the winter
- The days operated for each route vary, which can be confusing to potential passengers
- Overall NRTA has a good span of service, with hours that meet the demand on the route
- Service does not vary between weekdays and weekends but rather among seasons
- There is a large gap (26) between the minimum and maximum number of employees needed to operate the service due to the varying service levels between seasons
- The system is operating below max capacity on all routes. While there is ample capacity to handle existing and future ridership system-wide, there are still times of day and certain locations when/where capacity on a single bus or on a route is an issue
- Of the shoulder season routes, Sconset via Old South Road is the most financially efficient. This is most likely due to the higher speed limits in this corridor. The shorter routes are less financially efficient because of the short trip distance, traffic in and around downtown and lower fare.
- The Ferry Connector is the most cost efficient route because it is contracted service; without the contract it would be one of the least efficient
- Most of the routes have a farebox recovery ratio of 20% or higher, indicating a financially healthy system
- The airport route has the highest subsidy per passenger; Sconset via Old South Road has the lowest

This analysis will be used in conjunction with the market analysis and demographic projections, as well as the results of the outreach effort to develop year-round transit service alternatives for NRTA.

Appendix C – Market Analysis Technical Memorandum

NRTA Year-Round Bus Service Study

Market Analysis

Technical Memorandum

Prepared for

Nantucket Regional Transit Authority

Prepared by

AECOM Technical Services Inc.

LSC Transportation Consultants, Inc.

March 2016

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INTRODUCTION

Some of the key aspects of operating a transit system include knowing where your rider market lies, how it is evolving, and who your riders are. Demographics, land use, and socioeconomics, which highly impact ridership, are constantly changing. Thus, it is important to understand what and where the transit demand is in order to best align service to meet the needs of the riders. This section is divided into two parts. The first describes existing demographic, socioeconomic, and employment conditions and travel patterns on Nantucket. An extensive look at existing conditions during the operating season was completed in June 2015 as part of the NRTA Regional Transit Plan. This analysis focuses on elements specific to conditions during the off-season on the island. The second section includes 10-year population transit demand projections.

EXISTING CONDITIONS

Nantucket has a year-round population of around 11,000 people, based on information from the US Census Bureau 2014 American Community Survey (ACS). However, there are many people on the island that think the year-round number may be closer to 15,000 due to undocumented residents and other nontraditional living scenarios associated with island living. This study will use the 2014 ACS figures for consistency, but this information will be combined with results from the outreach effort when developing transit service alternatives and estimating ridership. This section creates a picture of the current conditions with regard to year-round residents, where they live and work, and how they travel around the island. It also includes a depiction of community characteristics and major destinations on the island.

Demographic Profile

On the island, approximately two thirds of the year-round population is working-age adults (18-64), the remaining one third being youths (under the age of 18) and seniors (aged 65 and over). There are 3,978 year-round households on the island, and 11,703 housing units, which gives an idea of seasonal population swell during the summer months. Of the year-round households on the island, 64% are owner-occupied and 36% are renter-occupied. Table 1 lists various demographic and housing characteristics of year-round residents.

Table 1: Population and Housing Statistics

Statistic	2014 Value
Population	10,856
Youths (under 18)	20.9%
Seniors (65 and over)	13.4%
Households	3,978
Housing Units	11,703
Occupied Year-Round	34%
Vacant or Seasonal	66%
Housing Tenure	
Owner-Occupied	64.2%
Renter-Occupied	35.8%

There are nearly 3x more housing units than households indicating a high seasonal population.

The following sections describe overall residential concentrations, the concentrations of youths and seniors, and ethnicity/language spoken at home.

Population Density

Another important demographic characteristic is the distribution of the population across the region. Population density maps can help identify where populations may be concentrated and where populations may be sparse. Observing population density over time can often indicate areas where the populations may be growing or declining. This can be particularly helpful in transit planning when considering how and where services can best meet the transportation needs of various populations.

Residential locations are concentrated in the downtown and mid-island regions of Nantucket. There are other smaller residential concentrations in Tom Nevers, Sconset, and Madaket. Figure 1 is a map of population density by block[1] from the 2010 Census. Since a large portion of the land area on Nantucket is protected, the unbuildable land is included to show the limits of density.

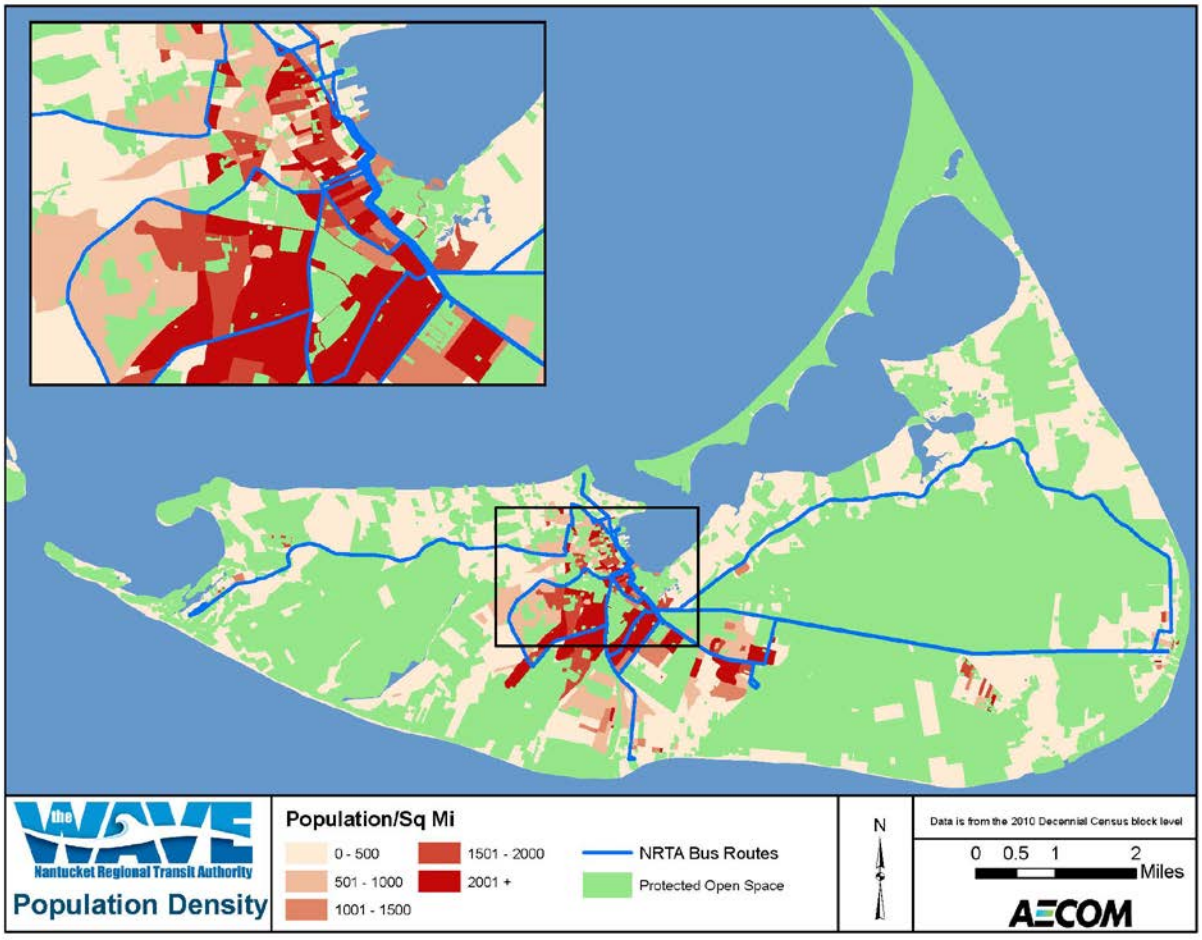

Figure 1: Population Density

[1] Block-level data is only available for decentennial census results; the smallest geographical unit used for the ACS is the block group.

Age

Age directly impacts mobility, especially for younger and older segments of the population. These populations often rely on transit for their transportation needs. Identifying where these populations are concentrated can indicate areas of potential transit demand.

Until the age of 16 youth are ineligible to drive, making them dependent on others or on non-motorized modes, such as walking and biking, or on transit for their mobility. Once youth turn 16, limited incomes often restrict their ability to own and maintain a vehicle. For the purpose of this study, youths are considered any persons under the age of 18. Youths comprise 21% of the year-round population.

Table 2 lists the youth and school enrollment statistics for the island. Schools on the island are generally located in the mid-island area. Schools are listed in the section on major trip generators in Table 8.

Each year the next incoming class of students is larger. In other words, there are an increasing number of youths on the island.

Table 2: Youth/School Statistics

Statistic	2014 Value
Youths (under 18)	20.9%
School Enrollment	
Preschool	220
Kindergarten	143
Elementary/Middle School	1,014
High School	457
College/Graduate School	582

Youth residential density is mapped in Figure 2. Youth residential locations are concentrated in the downtown and mid-island areas, as are school locations.

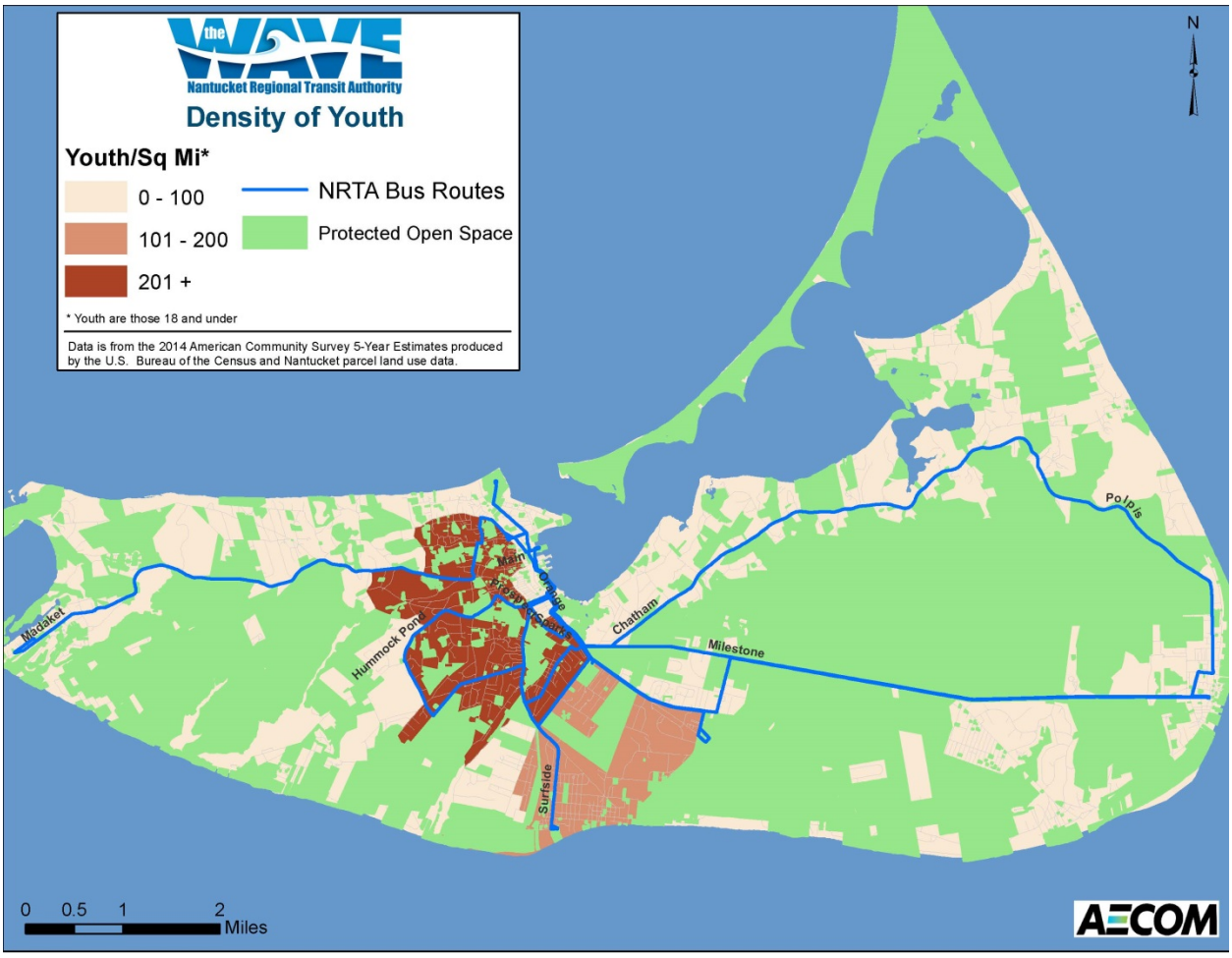

Figure 2: Youth Density

Senior citizens tend to locate in the more urban areas, where access to healthcare, services and activities are readily available. Seniors comprise 13% of the year-round population and are the fastest growing age group on the island[2].

Table 3: Senior, Veteran and Disabled Population Statistics

Statistic	2014 Value
Population	10,856
Seniors (65 and over)	13.4%
Veterans	495
Disabled Persons	759

Persons with disabilities are another segment of the population with unique transportation needs and patterns. Whether commuting to work, going to medical appointments, or accessing social services, disabled persons have many transportation needs. Also, as a whole, fewer disabled persons possess

[2] Commonwealth of Massachusetts, Office of the Secretary. *Long-Term Population Projections for Massachusetts Regions and Municipalities*, March 2015.

drivers' licenses than the general population. From the 2014 ACS, there are approximately 760 people (7% of the overall population) with disabilities on the island.

Veterans are retired military personnel who often have different transportation needs than the general public, including specific healthcare and socialization destinations. There are 495 veterans living on the island (5% of the overall population).

Figure 3 maps senior population density on the island. The senior residential density is primarily concentrated in the downtown area on the island and in the mid-island area adjacent to downtown. There are a few senior housing and nursing home facilities on the island including Landmark House, Our Island Home, Academy Hill, Sherburne Commons, and the Homestead of Nantucket, all of which are concentrated in or adjacent to the downtown and mid-island areas.

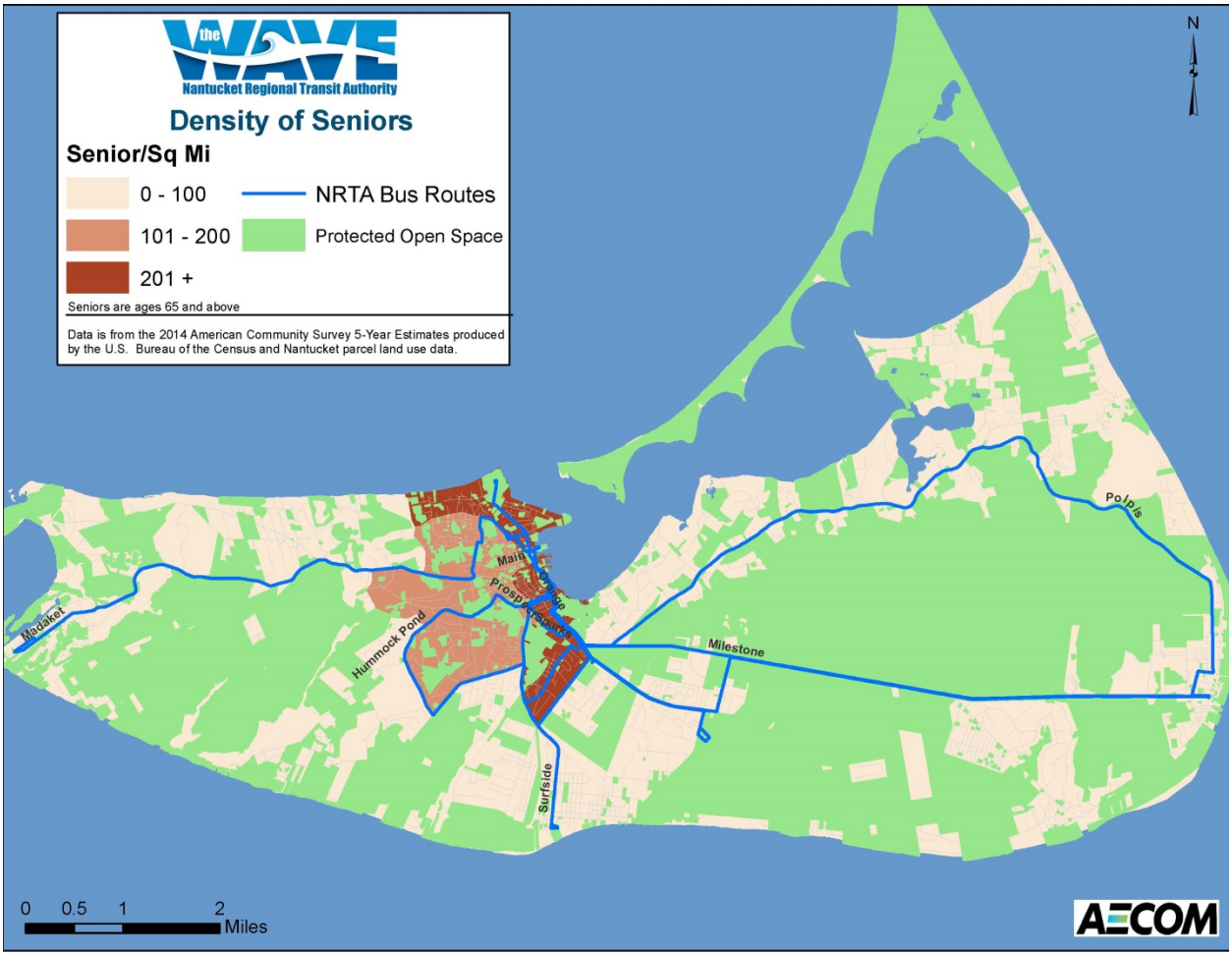

Figure 3: Senior Density

Ethnicity and Language Spoken at Home

The ethnic composition of the island is primarily white with a growing population of Hispanic or Latino residents (13% in 2014) and about 8% Black or African American. Table 4 lists the ethnic statistics on the island as well as the number of non-native English speakers who speak English 'less than very well.' The population able to speak English less than very well is an approximation of the number of people who need alternative language options for interaction. The largest proportion of the population able to speak English less than very well speaks Spanish natively (2.6% of the population).

Table 4: Ethnicity and Language Spoken at Home Statistics

Statistic	2014 Value
Population	10,856
Ethnicity	
White Alone	76.7%
Black or African American	8.1%
Hispanic or Latino	12.8%
Other	2.4%
Speak English Less than 'Very Well'	477
Spanish	286
Other	191

Residents who speak English 'less than very well' according to US Census Bureau statistics sometimes require alternative language options for interaction. 4.4% of the population on Nantucket speaks English less than very well, the majority of which speak Spanish natively.

Socioeconomic Profile

In an effort to understand the current socioeconomic and land use trends, it is advantageous to review past and projected conditions. Understanding the changes to the socioeconomic characteristics of the area can help explain historic changes to transit service as well as to justify adjustments to meet future transit needs. While they cannot explain changing conditions, data from the US Census can provide valuable indications of which conditions are changing and where.

Income

Income is a key determinant in the type of transportation used to commute. People with lower incomes are often more likely to be in need of public transportation options than people with higher incomes who can afford private transportation. On Nantucket, incomes and property values are higher than on the mainland. Table 5 includes the socioeconomic statistics of the year-round island population. The homeownership rate is 66% on Nantucket. The median value of an owner-occupied housing unit is $913,000. However, 9% of the year-round population is still living below the poverty level.

The median home value on Nantucket is over $900,000 (5 times higher than the national average), but the median annual household income is $86,500 (less than 2 times higher than the national average).

Table 5: Socioeconomic Statistics

Statistic	2014 Value
Homeownership Rate	65.8%
Median Value of Owner-Occupied Housing Units	$912,600
Per Capita Income	$47,548
Median Household Income	$86,529
Persons Living Below the Poverty Level	9.2%

Poverty is defined as an income level for individuals and families below which people are considered to be living in poverty annually by the US Census Bureau. For an individual in 2014, persons with annual income lower than $12,071 are considered to be living in poverty. For an average 4-person family with two kids, the poverty bar is set at $24,008. Figure 4 maps the concentration of the population living below the poverty level. The highest concentrations of people living below the poverty level are found in the mid-island and Sconset areas of the island. In the Sconset area of the island, there are fewer residents than in the downtown and mid-island areas, so a just few households living below the poverty level will skew the density. Additionally, there is a large cash economy on the island and official income figures do not include such income, that these households may not actually be living in poverty conditions. Finally, the poverty level is defined at the national level and may not be an exact fit for living conditions on Nantucket. However, it does give an idea of the relative distribution of reported income on the island.

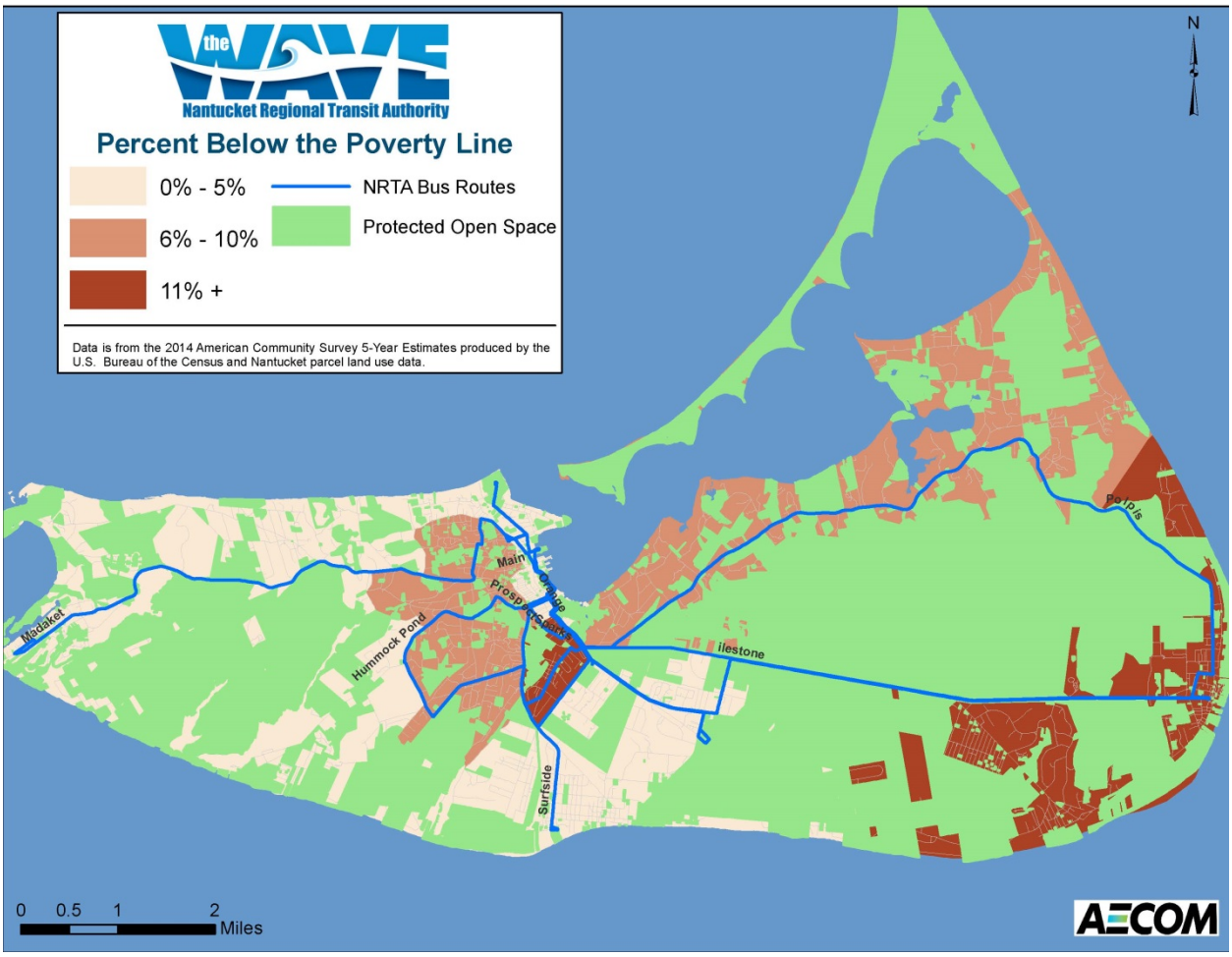

Figure 4: Percent of Population Living Below the Poverty Line

Natural and socioeconomic characteristics, such as age and income, are central in determining the location and level of service for bus routes, but other material and behavior characteristics, such as employment and commutation characteristics, are also essential. The next sections deal with the material and behavior characteristics of the people living on Nantucket as well as employment and commuting statistics.

Zero-Vehicle Households

Another common measure of transit dependence and demand is the number of cars per household. Zero-car households are considered to be entirely dependent upon alternate modes of transportation including carpooling/ridesharing, walking, and public transportation. Additionally, one-vehicle households with two adults are also partially dependent on alternate modes of transportation. The average number of people per household on the island is 2.5. There is a large percentage of the population on the island with 1 vehicle available per household (38%). This finding was confirmed during the outreach process; there are many households on the island with only one vehicle available so residents are carpooling or one householder is using the vehicle for commuting while the other stays in the home without a vehicle available. Approximately 5% of households have no vehicle available.

Table 6: Statistics on Vehicles Available by Household

Statistic	2014 Value
Vehicles Available by Household	3,978
No Vehicles Available	5.3%
1 Vehicle Available	37.5%
Average Persons per Household	2.5

Approximately 38% of households have only 1 vehicle available while the overall average persons per household is 2.5.

Figure 5 maps the percentage of the population without a vehicle available on the island. The largest percentage of households without vehicles is found in the mid-island area and secondarily in the Madaket and Polpis regions. As with the discussion on population living below the poverty level, the Polpis and Madaket regions have a smaller population than the downtown and mid-island areas, so just a few households without a vehicle available can skew the density figures.

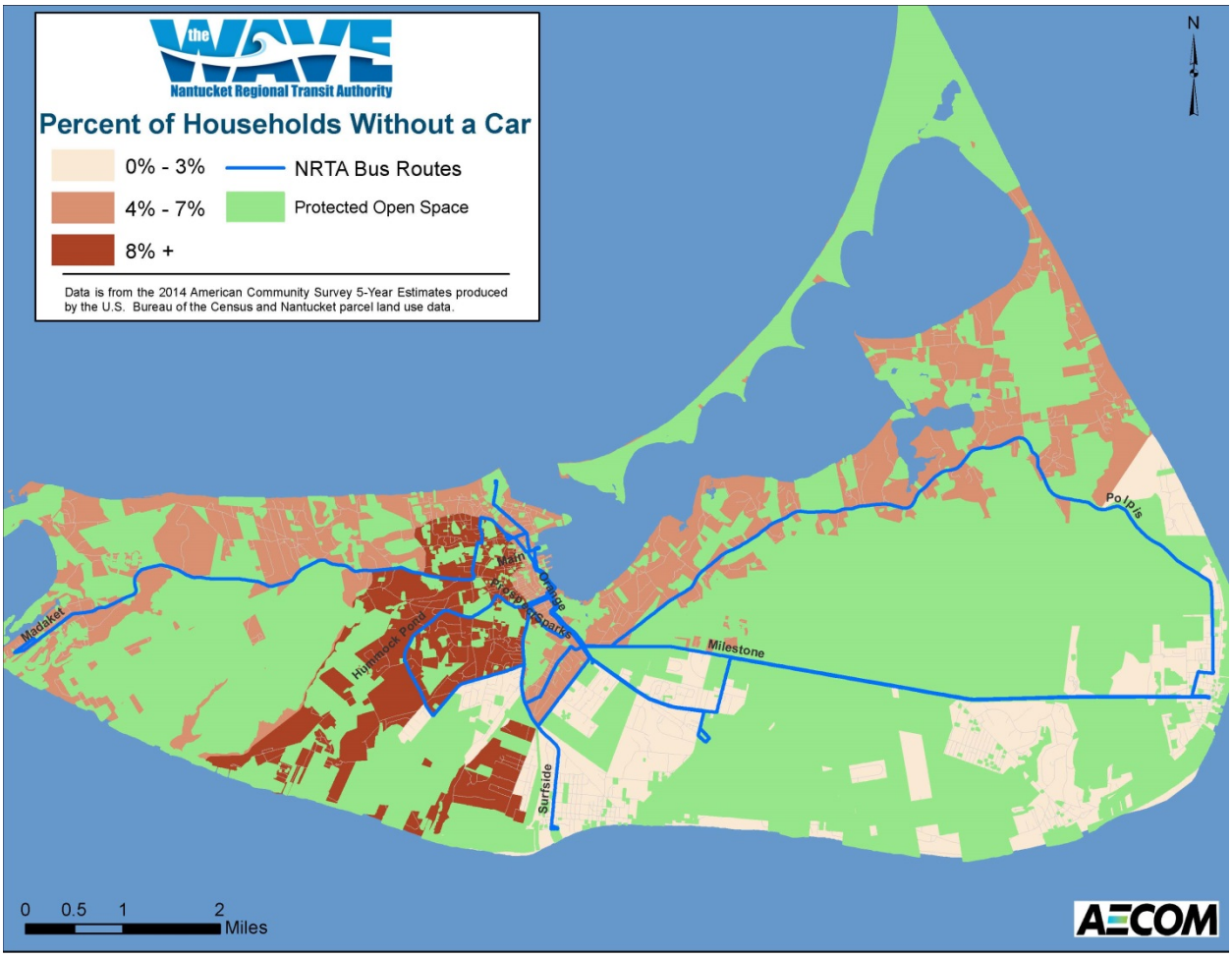

Figure 5: Percent of Households without a Vehicle Available

Employment and Travel Patterns

The trip to work is often the most frequent trip taken by many people; therefore, employment characteristics are important factors in the transportation and transit discussion. Large employers are commonly destinations for significant numbers of people, which make them important to transit service. Table 7 lists employment and commuting statistics for year-round residents. The unemployment rate on the island is very low – 2.5%.

Table 7: Employment/Commuting Statistics

Statistic	2014 Value
Population 16 and Over	8,396
Employed in Civilian Labor Force	6,145
Unemployed	2.5%
Mean Travel Time to Work	12.8 minutes
Commuting to Work	
Drove Alone	69.4%
Carpooled	10.7%
Public Transportation	1.8%
Walked	8.0%
Other means	6.3%
Worked at Home	3.8%
Occupation	
Management, business, science, and arts	28.5%
Service	20.0%
Sales and office	23.7%
Natural resources, construction, and maintenance	20.1%
Production, transportation, and material moving	7.8%
Class of Worker	
Private Worker	71.5%
Government Worker	13.2%
Self-Employed	15.3%

Employment

The year-round labor force on the island is primarily comprised of people working in management, business, science and arts (29%) occupations, 24% sales and office occupations, 20% each service and natural resources, construction and maintenance occupations, and 8% production, transportation, and material moving occupations. Seventy-two percent of the labor force is employed in private industry; 15% are self-employed, and 13% are government workers.

Commuting

The average travel time to work for island residents is 13 minutes. Most (69%) workers drive alone to work. Many also carpool (11%) and walk (8%) to work. Approximately 2% use public transportation to commute, 4% work at home, and 6% commute via other means.

Parking

Parking is very limited in the downtown. Most of the existing parking is primarily on-street with time restrictions and strict enforcement restrictions. Parking is enforced from 8AM-7PM. Parking locations and enforcement times are shown in Figure 6. During the off-season parking restrictions are lifted except in the yellow zone in the center. This lack of restriction in the off-season leads to parking spots being occupied by a single vehicle for long time periods and therefore to less parking availability overall. Both of these conditions are unattractive to downtown businesses that depend on a revolving customer base.

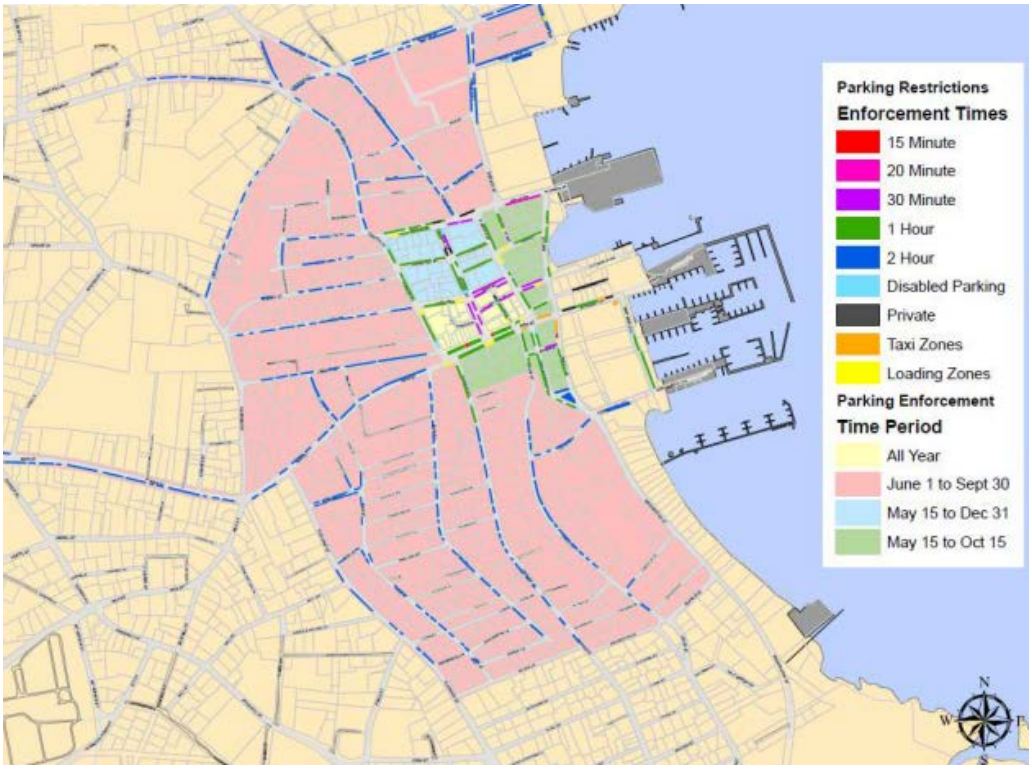

Figure 6: Parking Time Limits and Enforcement Times (Year-Round)

There are five park-and-ride locations used during the summer months on Nantucket. These facilities are used to discourage parking downtown. Combined, these lots offer approximately 330 spaces. Figure 7 shows the locations of park-and-ride lots on the island. Some may be available for use during the off-season as well.

Figure 7: Park-and-Ride Lots

Major Trip Generators

Major trip generators are locations frequented by a significant number of people, traveling by all modes, within the study area. Common transit generators include: healthcare facilities, transportation hubs, schools, shopping areas, social service agencies, and recreational areas (such as parks). These generators must be considered when evaluating transit service for a region. Table 8 lists the major trip generators on the island. The major destinations on the island are primarily located in the downtown and mid-island areas with the more seasonal generators outside of these areas.

Table 8: Major Trip Generators

Category	Generator	Location
Transportation	Ferry Terminals	Downtown Dock Area
	Airport	Old South Road
	Greenhound	Downtown
	Parking Lot	Fairgrounds Road
Civic	Atheneum (Library)	Downtown – Oak Street
	Police	Downtown/Mid-Island
	Fire	Sparks Avenue
	Public Works	Madaket Road
Education	High School/Middle School	Sparks Avenue
	Elementary School	Surfside Road
	Community School	Surfside Road
	New School	Nobadeer Farm Road
	Lighthouse School	Fairgrounds Road
	Athletic Fields	Nobadeer Farm Road
	Boys and Girls Club	Sparks Avenue
Healthcare	Cottage Hospital	South Prospect Street
	VA Clinic	South Prospect Street
Shopping	Stop and Shop	Downtown Dock Area
	Stop and Shop	Sparks Avenue
	Downtown	Downtown
	Sconset	Sconset
	Madaket	Madaket
	Mid Island	Old South Road
	Bartlett's Farm	Hummock Pond Road
Social and Cultural	Downtown	Downtown
	Dreamland Theatre	Downtown – South Water Street
	Research Library	Downtown – Fair Street
	Aquarium	Downtown Dock Area
	Community Ice Rink	Surfside Road
	Community Pool	Sparks Avenue
	Health Club	Old South Road
	Churches	Downtown

Commercial land use can also be used as a measure of employment density and points of interest. Commercial property makes up approximately 1% of the island's area and is largely concentrated in downtown ,mid-island and along Old South Road. Figure 8 is a map of land use on the island: commercial, residential, industrial, agricultural, and exempt/open space.

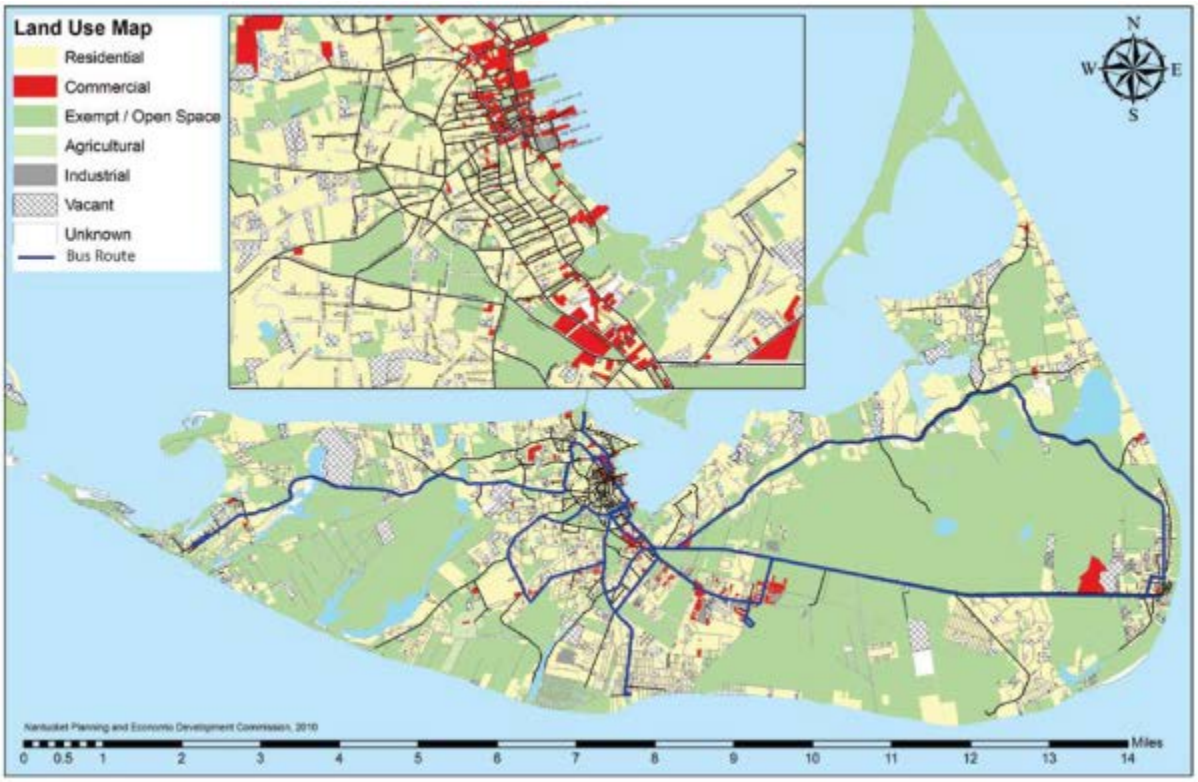

Figure 8: Land Use Map

Transit Score

The 'transit score' map is created in order to spatially analyze several transit-oriented demographic and socioeconomic characteristics at the same time (the characteristics discussed individually in this chapter so far). The transit score is a relative measure of how successful a fixed route transit system is expected to be in a particular region. Used in conjunction with an analysis of major transit generators, the transit score can be used to evaluate existing service as well as to identify areas of potential demand.

Demographic and socioeconomic information is collected from the US Census Bureau for a region divided into smaller geographic units such as tracts, block groups, or blocks. Block groups were used for this analysis. Transit-oriented variables used for the analysis include:

-Overall Population Density
-Density of the Population under the age of 18
-Density of the Population over the age of 65
-Percentage of the Population Living Below the Poverty Level
-Percentage of Zero-Car Households

Each of these variables has a strong correlation with transit success. Transit is most often successful in areas of high population density and in areas with high youth and senior populations. Transit is also traditionally successful in areas with low household and per capita income, high percentages of people living below the poverty level, and high percentages of households without vehicles available.

For a given region, the values for each of these variables are organized by geographic unit. For each variable, the values are arranged into categories of values using the quantile classification method of GIS analysis. For this analysis, all variables are divided into three classes. All of the values in each category (class) are then given a 'score' between 1 and 3, where 1 is low expectation of success and 3 is high expectation of success. Then, all of the scores are added up for each variable inside a geographic unit to give a total transit score. Eight variables are evaluated, so a score close to 15 means that a geographic unit has a high expectation for transit success; a score close to 5 means that there is low expectation for transit success. Transit scores are then mapped by geographic unit and quantile classification to show where demographic and socioeconomic variables lend themselves to potential transit success.

Figure 9 is a map of the transit success score for Nantucket along with the major trip generators identified on the island. The areas with the greatest probability of transit success are located in the downtown and mid-island areas of the island. The major trip generators are also located in the downtown and mid-island areas of the island, as well as along Old South Road and Nobadeer Farm Road. The market analysis shows that the year-round residential concentration, population segments more likely to need alternate modes of transportation including public transportation, and major destinations and employment locations are heavily concentrated in the downtown and mid-island areas of Nantucket.

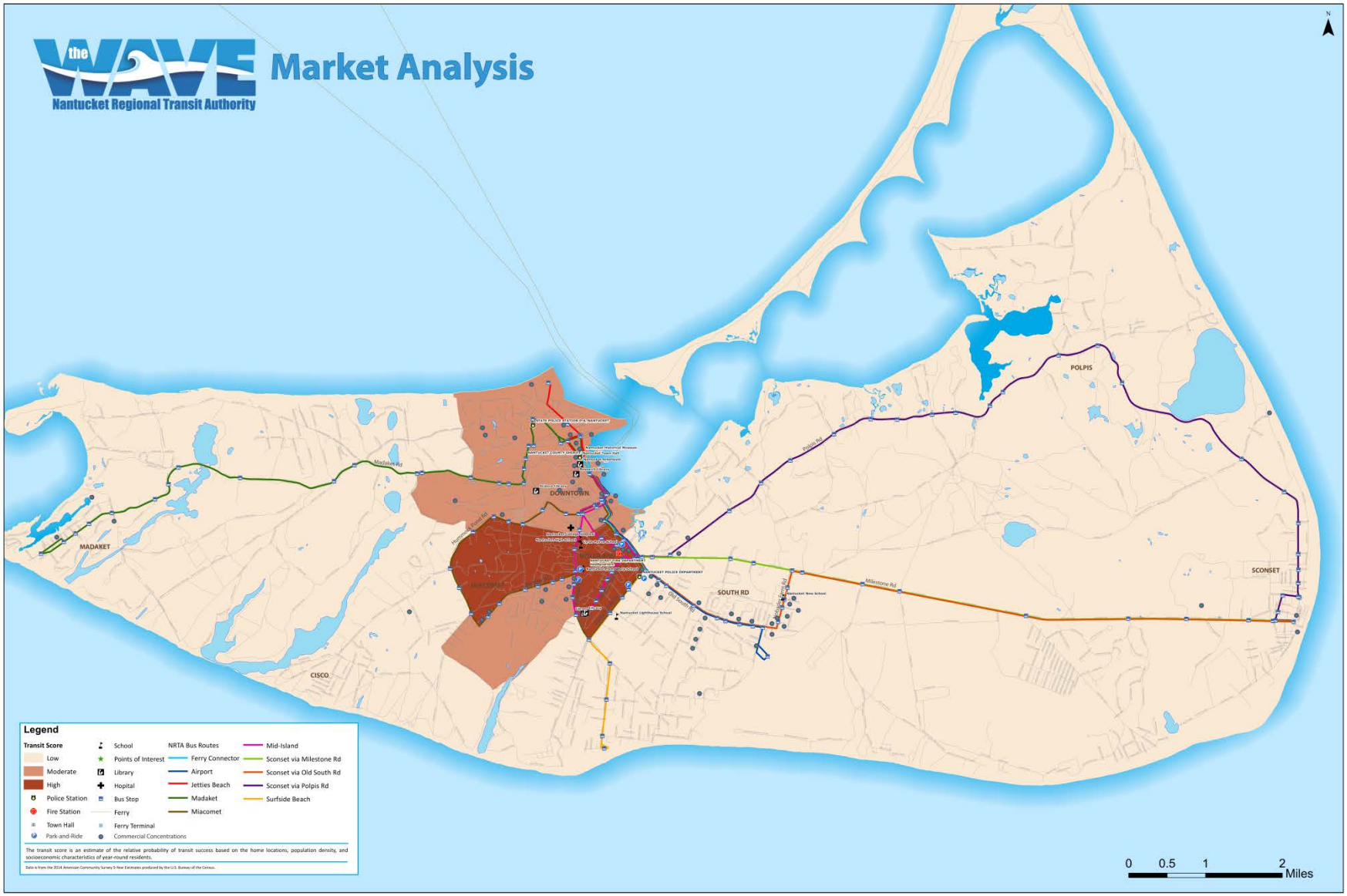

Figure 9: Transit Score and Major Trip Generator Map

10-Year Projections and Demand Estimation

The baseline data was taken from the 2010-2014 American Community Survey (2014 ACS) five-year estimates for the 10-year population projections. This baseline population is reflective of the island's winter and shoulder season. There is very little population change between the winter and shoulder season. Table 9 shows a comparison of the existing population (2014 data) and the 2024 population projections from the Commonwealth March 2015 projections for regions and municipalities. The table shows the 2024 population density and comparison for existing (2014 data) and 2024 data for various transit-dependent market segments such as zero-vehicle households, older adult population, ambulatory disability population, low-income population, and youth population. There is a dramatic increase in the island's population during the peak summer months in excess of 50,000 people compared to 11,000 people in the winter and shoulder season.

Table 9: 10-Year Demographic Projections

10-Year Demographic Projections Year-Round Residents															
Census Tract	Census Block Group	Land Area (sq. miles)	Total Population 2014 ACS	Population Projection 2024	Population Density 2024	Youth Population		Zero-Vehicle Households		Total Number of Older Adults 65 and Over		Ambulatory Disabled Population		Low-Income Population	
				#	(persons per sq. mi)	2014 ACS	2024	2014 ACS	2024	2014 ACS	2024	2014 ACS	2024	2014 ACS	2024
9501	1	1.24	907	926	747	262	268	32	33	178	182	116	119	54	55
	2	0.84	568	580	691	24	25	11	11	286	292	73	74	34	35
9502	1	0.47	1,719	1756	3734	309	316	42	43	151	154	108	110	223	228
	2	0.77	1,532	1565	2034	337	344	48	49	84	86	96	98	199	203
	3	0.71	1,346	1375	1939	477	487	0	0	10	10	84	86	175	179
	4	3.27	518	529	162	81	83	22	22	18	18	33	33	67	69
9503	1	9.52	345	352	37	66	67	9	9	74	76	8	8	9	9
9504	1	2.43	1,224	1250	515	286	292	14	14	110	112	84	86	12	13
	2	3.36	968	989	294	131	134	6	6	35	36	67	68	10	10
9505	1	8.89	524	535	60	80	82	6	6	102	104	27	28	66	68
	2	14.62	763	779	53	124	127	19	19	284	290	40	41	97	99
TOTALS		**46.11**	**10,414**	**10,637**	**10,265**	**2,177**	**2,224**	**209**	**213**	**1,332**	**1,360**	**736**	**752**	**947**	**967**

Note: Population projections were taken for Nantucket County from the UMass Donahue Institute (UMDI), 2015

Source: US Census Bureau, American Community Survey - 2014, LSC 2016.

Transit Demand Estimation

The need to estimate demand is important to determine capacity, service design, schedules, performance, and revenue. This section examines the demand for transit in the Nantucket study area and uses a fixed route demand model to help estimate the transit ridership.

In order to evaluate potential changes to the fixed route service, a fixed route demand model was developed. The model format is based on household vehicle ownership, average walking distance to bus stops, and frequency of operation. The basic approach is described in the paper *Demand Estimating Model for Transit Route and System Planning in Small Urban Areas, Transportation Research Board, 730, 1979*. This model incorporates factors for walking distance, the distance traveled on the bus, and the frequency of service or headway.

The calibrated fixed route demand model was used to determine the demand estimates for each of the proposed service alternatives. The demand estimates reflect adjustments made to three factors: the percentage of actual areas served, proposed headway, and walk distance. **It is important to note that the demand estimates are in number of daily trips – not people. For example, if a person uses transit to go back and forth to work and also to run a separate errand all in the same day, that is four trips by a single person.**

2014 Existing Fixed Route Demand

The model showing the daily demand during the off-season for the Nantucket study area is shown in Table 10. This model reflects the 2014 ACS data for the Nantucket area and was calibrated to the existing Nantucket Regional Transit Authority (NRTA) average daily ridership data from FY2015.

As shown in Table 10, the off-season model generated 2,073 daily trips—consistent with NRTA's average daily ridership during the shoulder season. This model does not include trips provided on the Island Ride Van Service (which includes ADA paratransit service).

The percentage of households with transit access was determined by the number of households within a quarter-mile of the transit service. Census block groups located entirely within a quarter-mile show 100 percent transit access.

This fixed route demand model is used to estimate ridership for the alternate service concepts during the off-season and future demand for bus services. The ridership estimates for the alternate concepts were incorporated into the model by changing the percentage of households served by transit, the walking distance, and frequency of service.

2014 Potential Fixed Route Demand

Potential fixed route demand for the off-season was estimated based on several assumptions. Based on these assumptions, the estimated demand for a fixed route service was generated to estimate the **upper limit** of potential transit demand. The assumptions included the headways, route structure throughout the community, and access to transit routes. The model used 20-minute headways on all routes, an average walking distance to the route of 1,000 feet, and 100 percent of all households having access to transit. The model generated 5,395 daily trips during the off-season, as shown in Table 11.

Table 10: Existing Fixed Route Demand

2014 Existing Fixed-Route Demand - Off-Season Nantucket County																		
Census Tract	Census Block Group	Total # of Hhlds 2014 ACS	# of Hhlds with 0 Auto	# of Hhlds with 1 Auto	% of Hhlds with Transit Access	Hhlds Served by Transit 0 Auto	Hhlds Served by Transit 1 Auto	Basic Transit Trip Rates 0 Auto	Basic Transit Trip Rates 1 Auto	Walk Distance (ft)	Walk Factor 0 Auto	Walk Factor 1 Auto	Headway (min)	Headway Factor 0 Auto	Headway Factor 1 Auto	Daily Transit Trips 0 Auto	Daily Transit Trips 1 Auto	Daily Trip # of
9501	1	380	32	202	85%	27	172	5.16	1.03	680	1.25	1.20	30	1.40	1.50	246	319	565
	2	251	11	159	40%	4	64	5.16	1.03	1,523	0.70	0.90	20	1.65	1.80	26	106	133
9502	1	640	42	282	100%	42	282	5.16	1.03	927	1.25	1.20	30	1.40	1.50	379	524	903
	2	478	48	142	50%	24	71	5.16	1.03	1,422	0.90	1.05	30	1.40	1.50	156	115	271
	3	383	0	95	40%	0	38	5.16	1.03	1,583	0.70	0.90	30	1.40	1.50	0	53	53
	4	249	22	124	10%	2	12	5.16	1.03	750	1.25	1.20	30	1.40	1.50	20	23	43
9503	1	151	9	38	15%	1	6	5.16	1.03	1,578	0.70	0.90	60	0.60	0.85	3	5	7
9504	1	454	14	148	25%	4	37	5.16	1.03	1,761	0.70	0.90	60	0.60	0.85	8	29	37
	2	430	6	157	30%	2	47	5.16	1.03	1,328	0.90	1.05	60	0.60	0.85	5	43	48
9505	1	210	6	38	10%	1	4	5.16	1.03	1,314	0.90	1.05	60	0.60	0.85	2	4	5
	2	352	19	106	5%	1	5	5.16	1.03	1,320	0.90	1.05	60	0.60	0.85	3	5	8
	Subtotal	3,978	209	1,491		108	738									**Estimated Daily Ridership**		**2,073**

Source: 2014 ACS Five-Year Estimates; LSC, 2016.

Table 11: Potential Fixed Route Demand

2014 Potential Fixed-Route Demand - Off-Season Nantucket County																	
Census Tract	Census Block Group	Total # of Hhlds 2014 ACS	# of Hhlds with 0 Auto	# of Hhlds with 1 Auto	% of Hhlds with Transit Access	Hhlds Served by Transit 0 Auto	Hhlds Served by Transit 1 Auto	Basic Transit Trip Rates 0 Auto	Basic Transit Trip Rates 1 Auto	Walk Distance (ft)	Walk Factor 0 Auto	Walk Factor 1 Auto	Headway (min)	Headway Factor 0 Auto	Headway Factor 1 Auto	Daily Transit Trips 0 Auto	Daily Transit Trips 1 Auto	Daily Trip # of
9501	1	380	32	202	100%	32	202	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	306	460	766
	2	251	11	159	100%	11	159	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	105	362	467
9502	1	640	42	282	100%	42	282	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	402	642	1,044
	2	478	48	142	100%	48	142	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	459	323	783
	3	383	0	95	100%	0	95	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	0	216	216
	4	249	22	124	100%	22	124	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	211	282	493
9503	1	151	9	38	100%	9	38	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	86	87	173
9504	1	454	14	148	100%	14	148	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	134	337	471
	2	430	6	157	100%	6	157	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	57	357	415
9505	1	210	6	38	100%	6	38	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	57	87	144
	2	352	19	106	100%	19	106	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	182	241	423
	Subtotal	3,978	209	1,491		209	1,491									Estimated Daily Ridership		5,395

Source: 2014 ACS Five-Year Estimates; LSC, 2016.

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2024 Projected Fixed Route Demand

Table 12 shows the 2024 projected fixed route demand estimate for the off-season. To calculate the 2024 projected fixed route demand during the off-season, the model used the projected population data from Table 9. As shown in Table 12, the 2024 projected fixed route demand model generated 2,368 daily trips during the off-season.

2024 Projected Potential Fixed Route Demand

A model was also created to estimate the 2024 projected potential fixed route demand for the off-season using the same assumptions as the 2014 potential demand mode to estimate the *upper limit* of potential transit demand. As shown in Table 13, the 2024 projected potential fixed route model generated 5,510 daily trips during the off-season.

Summary of Transit Demand Estimation (Trips)

The transit demand estimates for the number of daily trips in the off-season is nearly as high as the peak season ridership. This suggests that there is a lot of latent demand within the year-round population for transit service. Many year-round residents are simply not making trips in the off-season when transit service is not available or are making temporary arrangements (getting a ride, using taxis, carpooling, waiting for a shared vehicle to be available) in order to make their necessary trips.

Summary of Transit Demand Estimation (Level of Service)

Using population and employment statistics, an analysis of level of service demand was also conducted. Population statistics by block are from the 2010 census and employment statistics from 2011 INfoGroup Employment Data. The results are mapped on Figure 10.

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Table 12: Projected Fixed Route Demand

2024 Projected Fixed-Route Demand - Off-Season Nantucket County																		
Census Tract	Census Block Group	Total # of Hhlds 2024	# of Hhlds with 0 Auto	# of Hhlds with 1 Auto	% of Hhlds with Transit Access	Hhlds Served by Transit 0 Auto	Hhlds Served by Transit 1 Auto	Basic Transit Trip Rates 0 Auto	Basic Transit Trip Rates 1 Auto	Walk Distance (ft)	Walk Factor 0 Auto	Walk Factor 1 Auto	Headway (min)	Headway Factor 0 Auto	Headway Factor 1 Auto	Daily Transit Trips 0 Auto	Daily Transit Trips 1 Auto	Daily Trip # of
9501	1	388	33	206	85%	28	175	5.80	1.15	680	1.25	1.20	30	1.40	1.50	282	363	645
	2	256	11	162	40%	4	65	5.80	1.15	1,523	0.70	0.90	20	1.65	1.80	30	121	151
9502	1	654	43	288	100%	43	288	5.80	1.15	927	1.25	1.20	30	1.40	1.50	435	596	1,032
	2	488	49	145	50%	25	73	5.80	1.15	1,422	0.90	1.05	30	1.40	1.50	179	131	310
	3	391	0	97	40%	0	39	5.80	1.15	1,583	0.70	0.90	30	1.40	1.50	0	60	60
	4	254	22	127	10%	2	13	5.80	1.15	750	1.25	1.20	30	1.40	1.50	23	26	49
9503	1	154	9	39	15%	1	6	5.80	1.15	1,578	0.70	0.90	60	0.60	0.85	3	5	8
9504	1	464	14	151	25%	4	38	5.80	1.15	1,761	0.70	0.90	60	0.60	0.85	9	33	42
	2	439	6	160	30%	2	48	5.80	1.15	1,328	0.90	1.05	60	0.60	0.85	6	49	55
9505	1	214	6	39	10%	1	4	5.80	1.15	1,314	0.90	1.05	60	0.60	0.85	2	4	6
	2	360	19	108	5%	1	5	5.80	1.15	1,320	0.90	1.05	60	0.60	0.85	3	6	9
	Subtotal	4,063	213	1,523		110	753									Estimated Daily Ridership		2,368

Source: 2014 ACS Five-Year Estimates; LSC, 2016.

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Table 13: Projected Potential Fixed Route Demand

2024 Projected Potential Fixed-Route Demand - Off-Season Nantucket County																		
Census Tract	Census Block Group	Total # of Hhlds 2024 ACS	# of Hhlds with 0 Auto	# of Hhlds with 1 Auto	% of Hhlds with Transit Access	Hhlds Served by Transit 0 Auto	Hhlds Served by Transit 1 Auto	Basic Transit Trip Rates 0 Auto	Basic Transit Trip Rates 1 Auto	Walk Distance (ft)	Walk Factor 0 Auto	Walk Factor 1 Auto	Headway (min)	Headway Factor 0 Auto	Headway Factor 1 Auto	Daily Transit Trips 0 Auto	Daily Transit Trips 1 Auto	Daily Trip # of
9501	1	388	33	206	100%	33	206	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	313	470	783
	2	256	11	162	100%	11	162	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	108	370	477
9502	1	654	43	288	100%	43	288	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	411	656	1,066
	2	488	49	145	100%	49	145	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	469	330	799
	3	391	0	97	100%	0	97	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	0	221	221
	4	254	22	127	100%	22	127	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	215	288	503
9503	1	154	9	39	100%	9	39	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	88	88	176
9504	1	464	14	151	100%	14	151	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	137	344	481
	2	439	6	160	100%	6	160	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	59	365	424
9505	1	214	6	39	100%	6	39	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	59	88	147
	2	360	19	108	100%	19	108	5.80	1.15	1,000	1.00	1.10	20	1.65	1.80	186	247	432
	Subtotal	4,063	213	1,523		213	1,523									Estimated Daily Ridership		5,510

Source: 2014 ACS Five-Year Estimates; LSC, 2016.

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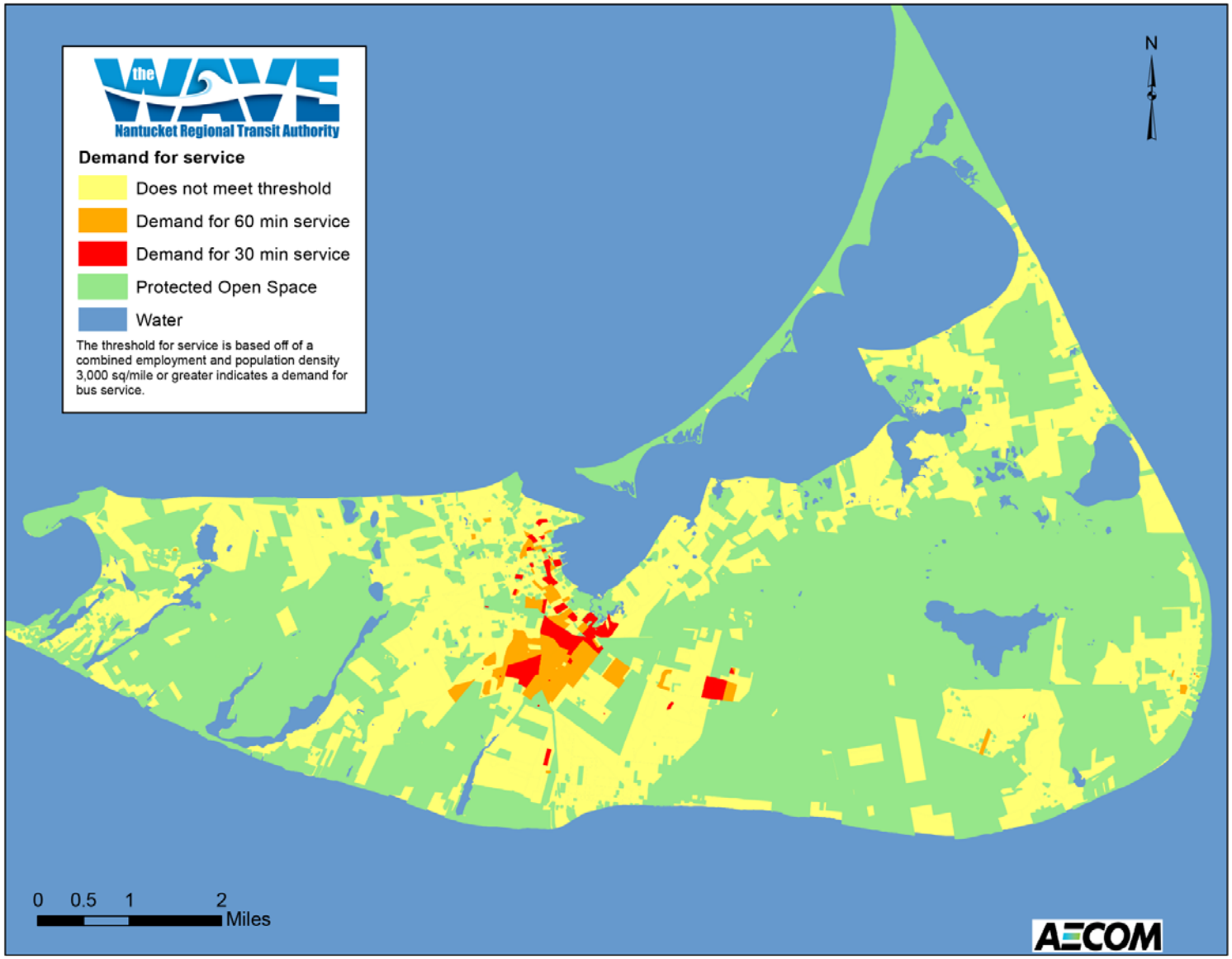
the WAVE
Nantucket Regional Transit Authority
Demand for service
Does not meet threshold
Demand for 60 min service
Demand for 30 min service
Protected Open Space
Water
The threshold for service is based off of a combined employment and population density 3,000 sq/mile or greater indicates a demand for bus service.
N
0 0.5 1 2
Miles
AECOM

Figure 10: Level of Service Demand

Appendix D – Alternatives Development Technical Memorandum

NRTA Year-Round Bus Service Study

Alternatives Development

Technical Memorandum

Prepared for

Nantucket Regional Transit Authority

Prepared by

AECOM Technical Services Inc.

April 2016

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TRANSIT SERVICE ALTERNATIVES

A long list of alternatives was developed and evaluated based on information provided through input from the public and by information from operational and transit market analyses.

In general, three service alternatives are presented:

Option 1 provides full off-season service on the Island. Service operates 217 days between mid-October and mid-May with service 14 hours a day, seven days a week.

Option 2 also provides full off-season service, 217 days between mid-October and mid-May. Service also operates seven days a week, however weekday service span is 14 hours and weekend service span is 11 hours. There is less service frequency than the Option 1 alternatives.

Option 3 provides service for 84 days during the extended shoulder seasons on the island. Generally, this is between the Daffodil Festival in the spring and through the Christmas Stroll in the winter.

Mid Island Loop

In Option 1, the Mid Island Loop would operate along the same alignment as it does during the summer. Service operates 14 hours on weekdays and weekends with a 30 minute headway. In Option 2, the Mid Island Loop would cover the same route as Option 1 but would operate only 11 hours on the weekends. In Option 3, the Mid Island Loop would cover the same route as Option 1 but would only operate during the extended shoulder season. On weekdays, this route would operate 14 hours a day while on weekends the route would only provide service for 11 hours.

Table 1: Mid Island Loop Alternatives

Indicator	Option 1	Option 2	Option 3
Round-trip Mileage	4.1	4.1	4.1
Cycle time (min)	30	30	30
Headway (min)	30	30	30
Weekday Service Span	14 hrs	14 hrs	14 hrs
Weekend Service Span	14 hrs	11 hrs	11 hrs
Additional Days Operated	217	217	84
Driver Requirement (FTE)	2.45	2.3	2.3
Vehicle Requirements	1	1	1
Total New Rev. Hours	3,038	2,852	1,104
Total New Rev. Miles	12,456	11,693	4,526
Projected Ridership	39,439	37,024	14,332
Projected Riders/Day	182	171	171
Operating Cost*	$288,610	$270,940	$104,880

*Does not include farebox revenue

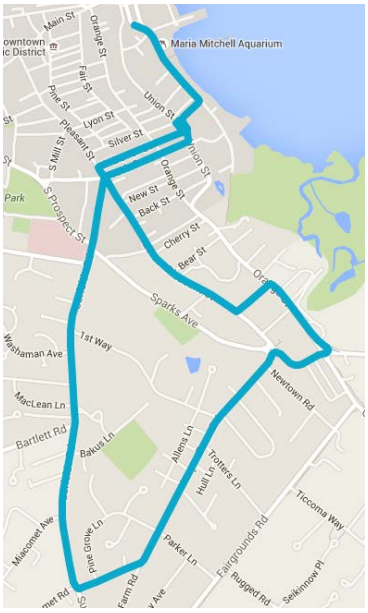

Figure 1: Mid Island Loop Map

Miacomet Loop

The Miacomet Loop would operate along the same alignment as it does during the summer, traveling in a clockwise direction. In Option 1 service would operate 14 hours a day, seven days a week with a headway of 30 minutes. Option 2, would cover the same route as Option 1 but would operate only 11 hours on the weekends. In Option 3, the Miacomet Loop would only operate during the extended shoulder season. In Option 3 on weekdays, this route would operate 14 hours a day while on weekends the route would only provide service for 11 hours.

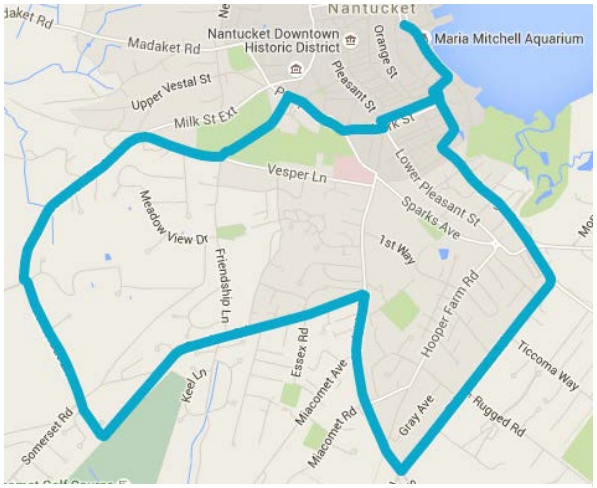

Figure 2: Miacomet Loop Map

Table 2: Miacomet Loop Alternatives

Indicator	Option 1	Option 2	Option 3
Round-trip Mileage	7	7	7
Cycle time (min)	30	30	30
Headway (min)	30	30	30
Weekday Service Span	14 hrs	14 hrs	14 hrs
Weekend Service Span	14 hrs	11 hrs	11 hrs
Additional Days Operated	217	217	84
Driver Requirement (FTE)	2.45	2.3	2.3
Vehicle Requirements	1	1	1
Total New Rev. Hours	3,038	2,852	1,104
Total New Rev. Miles	21,266	19,964	7,728
Projected Ridership	43,084	40,447	15,657
Projected Riders/Day	199	186	186
Operating Cost*	$288,610	$270,940	$104,880

*Does not include farebox revenue

Mid Island and Miacomet Loop Combination (new)

The Mid Island and Miacomet Loop Combination is a new route and is a combination of the existing Mid Island Loop and Miacomet Loop routes. This route would operate service beginning in downtown and travelling along Francis Street, Union Street, Orange Street, Sparks Avenue, Hooper Farm Road, Surfside Drive, Surfside Road, Bartlett Road, Somerset Lane, Hummock Pond Road, Joy Street, Prospect Street, York Street, W Dover Street and back towards downtown. Service operates 14 hours on weekdays and weekends with headway of 30 minutes.In Option 2, the Mid Island and Miacomet Loop Combination would cover the same route as Option 1 but would operate only 11 hours on the weekends. This route is not included in the Option 3 alternative.

Table 3: Mid Island and Miacomet Loop Combination (new) Alternative

Indicator	Option 1	Option 2
Round-trip Mileage	6.5	6.5
Cycle time (min)	30	30
Headway (min)	30	30
Weekday Service Span	14 hrs	14 hrs
Weekend Service Span	14 hrs	11 hrs
Additional Days Operated	217	217
Driver Requirement (FTE)	2.45	2.3
Vehicle Requirements	1	1
Total New Rev. Hours	3,038	2,852
Total New Rev. Miles	19,747	18,538
Projected Ridership	87,885	87,904
Projected Riders/Day	405	405
Operating Cost*	$288,610	$270,940

*Does not include farebox revenue

Figure 3: New Mid Island Miacomet Combination Route

Old South Rd/Turn-around (new)

The Old South Road/Nobadeer Farm Road – Turn Around is a new route proposed for NRTA WAVE year-round service.There are two variations of this route and either variation could be used for any of the options. In variation 1 service would begin in downtown and travel along Francis Street, York Street, Atlantic Avenue, Sparks Avenue, and Old South Road (servicing the Park-and-ride) to Nobadeer Farm Road where it would turn around at the athletic fields on the west side of Nobadeer Farm Road. The route then travels back from Nobadeer Farm Road along Old South Road and Orange Street back towards downtown. In Variation 2 the route would begin downtown on Broad Street by the Steamship Authority terminal and continue to S. Water Street, Washington Street, Francis Street, Union Street, Orange Street, Old South Road and Nobadeer Farm Road where it would also turn around at the athletic fields. In variation 2 the return trip would follow the same alignment. For both variations in Option 1 service would operate 14 hours on weekdays and weekends with a 30 minute headway. In Option 2, both variations are possible but they would operate with less frequency (60 minute headway) and only 11 hours on the weekends.

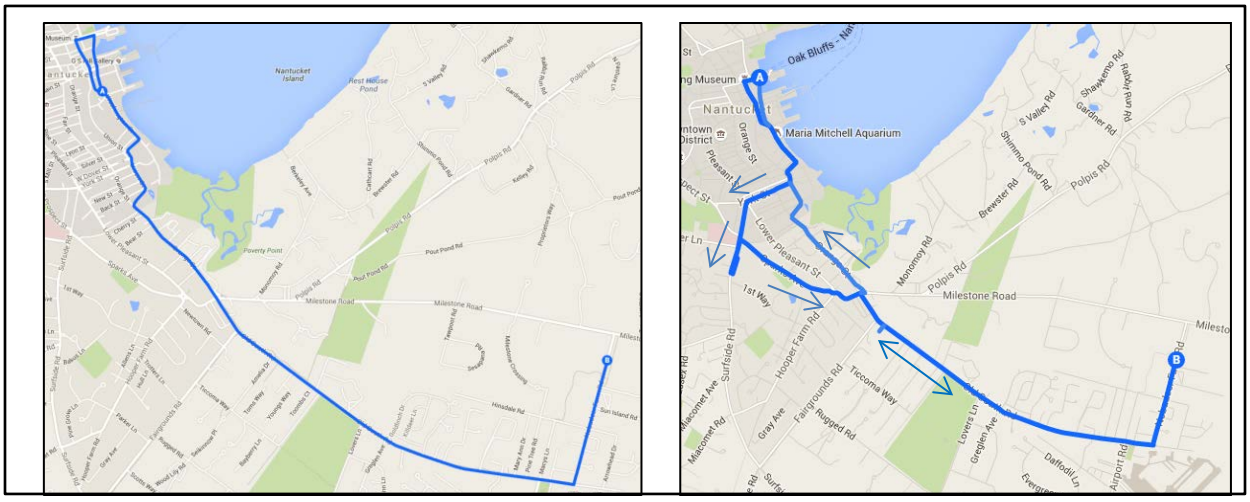

Figure 4: Left: Variation 2, Right Variation 1. Old South Road/Turn-Around Maps

Table 4: Old South Rd/Turn-Around Alternatives

Indicator	Option 1	Option 2
Round-trip Mileage	7	7
Cycle time (min)	60	60
Headway (min)	30	60
Weekday Service Span	14 hrs	14 hrs
Weekend Service Span	14 hrs	11 hrs
Additional Days Operated	217	217
Driver Requirement (FTE)	4.9	2.3
Vehicle Requirements	2	1
Total New Rev. Hours	6,076	2,852
Total New Rev. Miles	42,532	19,964
Projected Ridership	124,601	62,314
Projected Riders/Day	574	287
Operating Cost*	$577,220	$270,940

*Does not include farebox revenue

Old South Rd/Milestone Loop (new)

The Old South Road/Nobadeer Farm Road/Milestone Loop – Turn Around is a new bi-directional route proposed for NRTA off-season service. Service would begin in downtown and travel along Francis Street, York Street, Atlantic Avenue, and Sparks Avenue. On Milestone Road, Nobadeer Farm Road, and Old South Road service would be bidirectional with buses on the hour traveling clockwise and on the ½ hour counter clockwise. Orange Street would be used to head back downtown. Service would operate 14 hours a day, seven days a week. Between Downtown and the roundabout there would be 30 minute service and along Old South and Nobadeer Farm Road 60 minute service in either direction resulting in a cumulative level of service being every 30 minutes. This route is not proposed for Option 2 or Option 3 service alternatives.

Table 5: Old South Rd/Milestone Loop Alternative

Indicator	Option 1
Round-trip Mileage	6.3
Cycle time (min)	60
Headway (min)	60
Weekday Service Span	14 hrs
Weekend Service Span	14 hrs
Additional Days Operated	217
Driver Requirement (FTE)	4.9
Vehicle Requirements	2
Total New Rev. Hours	6,076
Total New Rev. Miles	38,279
Projected Ridership	130,851
Projected Riders/Day	603
Operating Cost*	$577,220

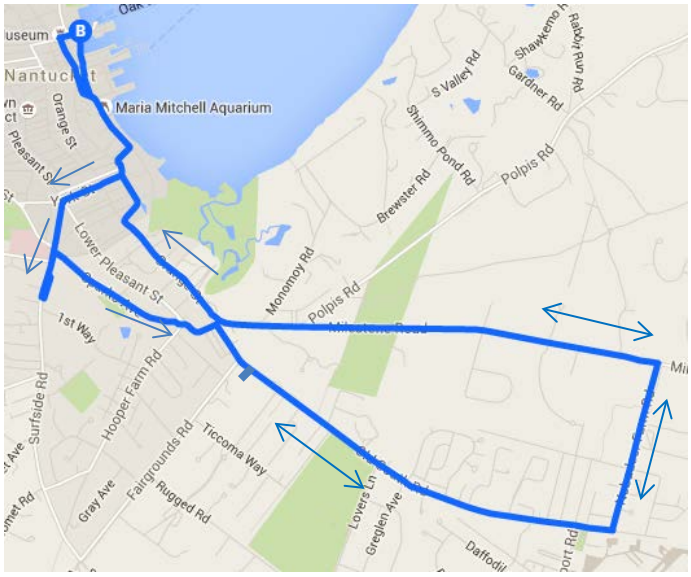

Figure 5: Old South Rd/Milestone Loop Map

Sconset via Old South Road Route

The Sconset via Old South Road Route would provide service to the eastern part of the island and would follow the existing routing of the Sconset via Old South Road Route but would also service the Park-and_ride lot. In option 1 there would be four trips a day (two AM trips, two PM trips) on weekdays and weekends. Option 2 operate with only three trips per day: one AM trip, one mid-day trip and one PM trip on weekdays and weekends. There are two Option 3 alternatives to provide service during the extended shoulder season. In Option 3A, the route operates 14 hours on weekdays and 11 hours on the weekends with a 60 minute headway. In Option 3B, the route operates on a 120 minute headway.

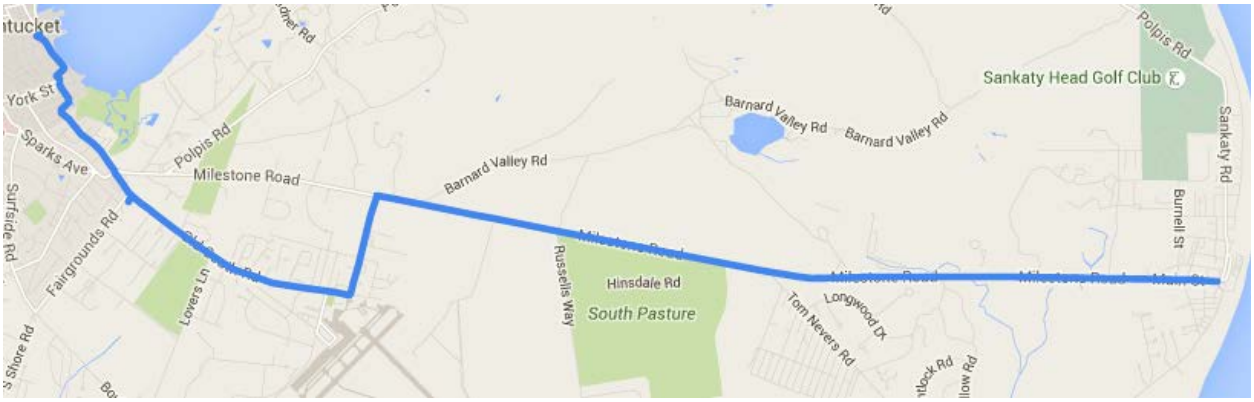

Figure 6: Sconset via Old South Road Route Map

Table 6: Sconset via Old South Road Route Alternative

Indicator	Option 1	Option 2	Option 3A	Option 3B
Round-trip Mileage	17.5	17.5	17.5	17.5
Cycle time (min)	60	60	60	60
Trips per day/ headway	4	3	60 min	120 min
Weekday Service Span	14 hrs	14 hrs	14 hrs	14 hrs
Weekend Service Span	14 hrs	11 hrs	11 hrs	11 hrs
Additional Days Operated	217	217	84	84
Driver Requirement (FTE)	0.7	0.525	2.3	1.15
Vehicle Requirements	1	1	1	0.5
Total New Rev. Hours	868	651	1,104	552
Total New Rev. Miles	15,190	11,393	19,320	9,660
Projected Ridership	14,374	10,781	18,282	9,141
Projected Riders/Day	66	50	218	109
Operating Cost*	$82,460	$61,845	$104,880	$52,440

*Does not include farebox revenue

Madaket Route

The Sconset via Old South Road Route provide service to the western part of the island would operate along the same alignment as it does during the summer. In Option 1 service operates three trips a day (one AM trip, one mid-day trip and one PM trip) on weekdays and weekends. In Option 2, service would operate with only two trips per day: one AM trip and one PM trip on weekdays and weekends. There are four Option 3 alternatives to provide service during the certain periods of the extended shoulder season. In Option 3A, service would be added to extend the spring shoulder season to begin in April with a

service span of 14 hours on weekdays and 11 hours on the weekends and a 60 minute headway. In Option 3B, service would be extended in both shoulder seasons to begin in April and end in December It would have a service span of 14 hours on weekdays and 11 hours on the weekends with a 60 minute headway. Option 3C is similar to Option 3B but would have a 120 minute headway. Lastly, Option 3D would extended the fall shoulder season until Columbus Day. In this option, extended service would run 14 hours on weekdays and 11 hours on weekends with a 60 minute cycle time.

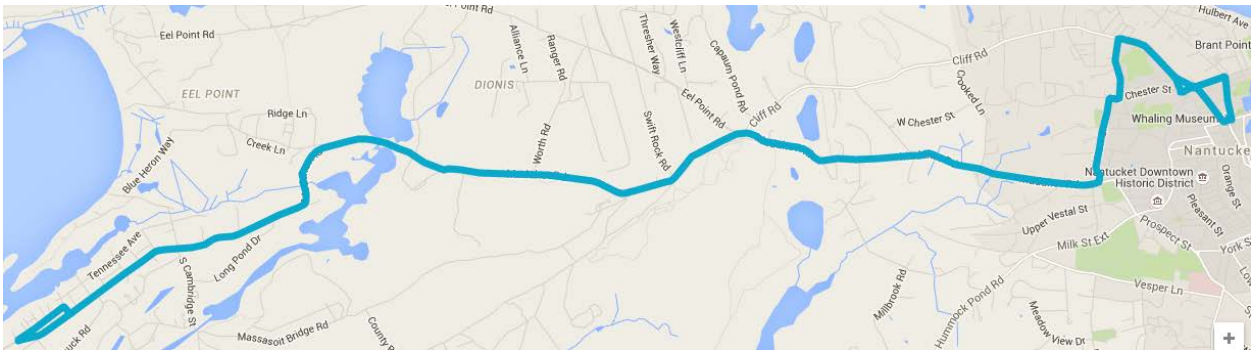

Figure 7: Madaket Route Map

Table 7: Madaket Route Alternative

Indicator	Option 1	Option 2	Option 3A	Option 3B	Option 3C	Option 3D
Round-trip Mileage	12.5	12.5	12.5	12.5	12.5	12.5
Cycle time (min)	60	60	60	60	60	60
Trips per day/ headway	3	2	60 min	60 min	120 min	60 min
Weekday Service Span	14	14	14	14	14	14
Weekend Service Span	14	11	11	11	11	11
Additional Days Operated	217	217	23	84	84	29
Driver Requirement (FTE)	.525	.35	2.3	2.3	1.15	2.3
Vehicle Requirements	1	1	1	1	.5	1
Total New Rev. Hours	651	434	368	1,564	782	368
Total New Rev. Miles	8,138	5,425	4,600	19,550	9,775	4,600
Projected Ridership	6,741	4,494	3,811	13,363	6,681	2,939
Projected Riders/Day	31	21	45	159	80	35
Operating Cost*	$82,460	$61,845	$34,960	$148,580	$74,290	$34,960

*Does not include farebox revenue

Ferry Connector

Service is proposed during the extended season (Option 3) for the Ferry Connector. This route operates service between the Ferry Connector Lot and the Steamship Authority. The service span for this route would be 14 hours on weekdays and 11 hours on weekends with a headway of 20 minutes. In Options 1 and 2 service between the ferry docks and the park-and-ride lot would be incorporated into the new Old South Road/Nobadeer Farm Road Routes.

Table 8: Ferry Connector Alternative

Indicator	Option 3
Round-trip Mileage	3.2
Cycle time (min)	40
Headway (min)	20
Weekday Service Span	14 hrs
Weekend Service Span	11 hrs
Additional Days Operated	84
Driver Requirement (FTE)	4.6
Vehicle Requirements	2
Total New Rev. Hours	2,208
Total New Rev. Miles	18,253
Projected Ridership	8,587
Projected Riders/Day	102
Operating Cost*	$209,760

*Does not include farebox revenue

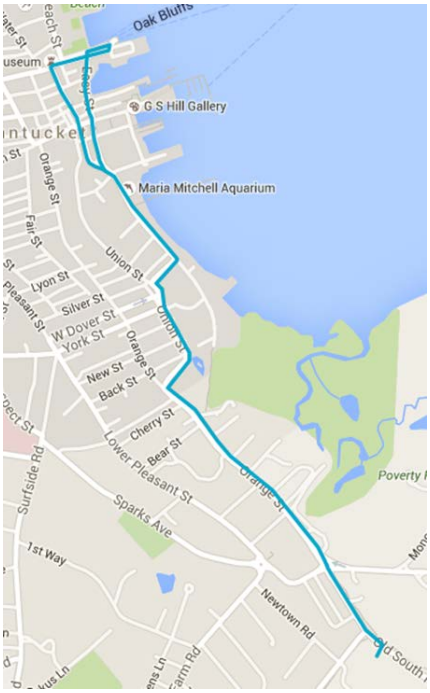

Figure 8: Ferry Connector Map